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Developers Say Microsoft's Removal of JVM From Windows XP Has Little Impact ..3
Blueprint Merges Reuse Onto RAMP 3
Halcyon Days For .NET Migration 4
Novell Readies NetWare 6 4
Changing Times Call For New Tools of Change 7
Documentum Joins Web Services Fray 8
JMS Courier Integrates Java With C++ 12
IBM Proposes Reliable HTTP Message Standard ...14
WRQ Moves Hosts to XML 14
CORBA Getting JMS Connection 16
GenX 1.5 to Run Wizards From the Command Line ...19
Wind River Releases Foundation HA 23
HillCast Handles Heavy Hitters 23
Aligo Mobile Server Integrates With Forte 24
Annasoft Suite Jump-Starts Win CE-Based Devices 24
Boston Embedded Systems Conference Gains a Day ..25

UML Makes Its Way Into the IDE 26

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BUSINESS PROCESS LANGUAGE TO CONNECT TO WEB SERVICES

Major initiative next month will allow BPML to interact with other protocols

BY DOUGLAS FINLAY

Web services are about to get another big boost up the stack. The Business Process Management Initiative (BPMI) next month will announce a major interface extension to the Business Process Modeling Language (BPML) that will enable the language to communicate with other Web services protocols, such as the Web Services Description Language (WSDL) and Simple Object Access Protocol (SOAP). BPML version 0.5 will permit WSDL, for example, to recognize multiple business processes while enabling developers to connect back-office applications as well as front-end business partners using all available Web services protocols.

Together as a consortium since August 2000, BPMI has a membership that comprises 134 companies, including Hewlett-Packard Co., IBM Corp., PeopleSoft Inc., Sun Microsystems Inc. and Vitria Technology Inc.

Of major import in connecting BPML to underlying Web services protocols is that "it will bring order and architecture to those Web services underneath

▸ continued on page 19

Sun Tackles Compatibility In Bean Spec

IIOP biggest addition to EJB 2.0 in effort to improve interoperability

BY EDWARD J. CORREIA

The release of J2EE 1.3 beta 2 includes a plan to improve interoperability within the EJB 2.0 specification, and possibly back it up with certification. Sun Microsystems Inc. has given component developers new hope that this nascent market will begin to loosen the stranglehold that Microsoft Corp. technologies have on the component industry.

Enhancements to the EJB specification, which is due in September, will include integration with Java Message Service and improved container-managed persistence, easing data modeling and portability. JMS also will introduce asynchronous messaging to EJBs, which permits the components to receive and act on messages without user interaction. Also new will be a query language, which, according to Sun, will permit beans to locate and exchange data more rapidly.

An EJB compliance stamp is up to the JCP, says Sun's Galantine.

Judith Lilienfeld, Sun's senior product manager for J2EE-compatible markets, said most significant is the addition of the Internet Inter-ORB Protocol to J2EE. "IIOP has become required for the J2EE 1.3 specification for EJB 2.0 interoperability," she said. "Now you can have an EJB in one vendor's application server talking to an EJB in another vendor's application server."

Sam Patterson, CEO of ComponentSource, was optimistic about the

▸ continued on page 16

Market Surges in Java-Enabled Phones

BY EDWARD J. CORREIA

In the two months following this year's JavaOne conference, an event that witnessed a surge in Java 2 Micro Edition developers and wares, there has been an outpouring of Java-enabled phones, giving developers what some say is an ideal means to mobilize their enterprise applications.

Java can form a common thread to allow developers to build apps for disparate phones.

Most mobile phone vendors have announced support for the technology. According to Adam S. Braunstein, senior research analyst with Robert Frances Group, an IT advisory and consultancy based in Westport, Conn., others will follow. "I would expect to see Java in the bulk of new telephones released in the next year."

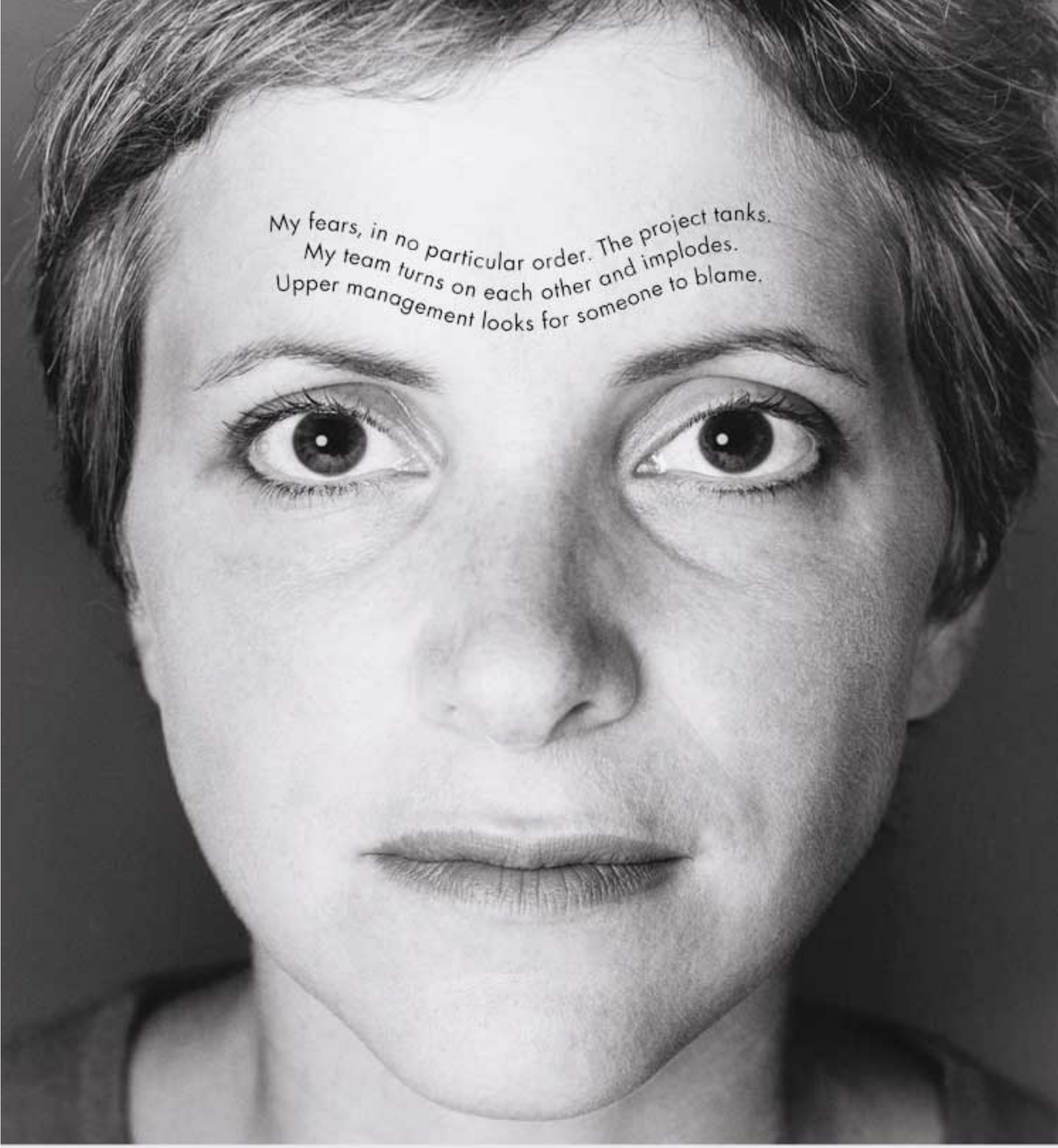
Braunstein is optimistic about what Java will do for developers seeking to mobilize enterprise applications. "It won't help the wireless [problems], but it will help connect Java-enabled phones to the back ends," he said. "Rather than having a bunch of cell phones, each with a different API, Java 2 brings a common base to write to if you are trying to extend an enterprise application to a phone. Now you can take advantage of Java capabilities on phones whether they're made by Motorola, Nokia, Samsung or whomever, as well as on Palm and RIM devices."

Claiming to be the first domestic carrier out of the gate with Java phones is Nextel Communications Inc. According to Ben Ho, director of strategic partner marketing with Nextel, the company is targeting vertical markets, such as construction and transportation industries, with services and devices, two of which run J2ME MIDlets.

Ho said now that his phones offer Java, customers can add data persistence, and exert more control over their applications, including the GUI. "WAP has absolutely no graphics; its look is a menu format." Ho also said that real-time applications are impossible with the Wireless Application Protocol, implying that Java has passed WAP by. Another benefit of Java is local execution; programs can run regardless of network coverage, and persistence lets applications store data locally. Nextel offers free development tools (http://developer.nextel.com), support and sample code. Finished applications may be submitted to Nextel for certification (and endorsement) or simply posted to a "use-at-your-own risk" section.

According to Curtis Sasaki, director of technology advocacy at Sun Microsystems Inc., local

▸ continued on page 23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My team turns on each other and implodes.
Upper management looks for someone to blame.

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ROGUE WAVE SOFTWARE

No Java, No Big Deal

Developers say removal of JVM from Windows XP has little impact

BY DAVID RUBINSTEIN

While Microsoft Corp.'s decision to remove its Java Virtual Machine from the forthcoming desktop Windows XP operating system touched off an immediate flurry of reaction, the news was met largely with yawns in the development community.

"It's a nonissue from my point of view," said Casey Kochmer, president of Amberjack Software and publisher of the JSP Insider Web site (www.jspinsider.com). "There is a client-side issue that Sun has been addressing with Web Start, and this could give that some momentum." Web Start is Sun Microsystems Inc.'s tool for allowing users to automatically download and install a Java Virtual Machine via a Web browser.

According to David Harrah, Sun's group manager for Java public relations, Microsoft's motivation "is to make people think, 'I'll stop developing in Java and wait for C# and .NET.' But why as a developer would I bother doing that?" Microsoft failed to answer repeated requests for an explanation of the decision.

Harrah said desktop interaction with Java is moving toward Java Server Pages (JSP), which are executed on a server. From that point of view, the move will have "zip impact," he said.

Harrah said that more than 7.2 million Web pages have Java applets, and that is what is being put at risk by Microsoft's move. In the January settlement of a protracted court fight between Sun and Microsoft over Java, Microsoft asked to continue to distribute its out-of-date versions of Java, and Sun agreed. "They're pulling out a customer benefit people have come to expect," Harrah said.

Sam Patterson, CEO of ComponentSource, an online marketplace that sells ActiveX and EJB components, said the move is the result "of Sun not wanting Microsoft to run Java better." It has been widely acknowledged in the industry that Microsoft's runtime, before the technology passed its implementation by, was among the best-performing JVMs on the market, and its Visual J++ development environment also was popular. "For developers, there will be no impact. Jscript still is in Visual Studio.NET, and that'll come with a JVM. And Internet Explorer will download a JVM automatically."

In corporate intranets, companies can distribute Java Virtual Machines internally to run Java applications, according to Sun's Harrah, while JSP provides Web pages with the JVM running on the server.

The move did raise serious questions in the developer community about interoperability between the systems. "In the real world, the biggest issue has been how close will we get with interoperability between Microsoft and Java platforms," said Bill Devine, vice president of information technology at insurance and financial giant Prudential in Newark, N.J. "You can't have, say, Microsoft XML and Java in different places. They'll have to find a way to share the wealth, or they'll prevent us from enjoying the growth they're looking for."

Rob Morris, senior marketing director at interface server provider Jacada, said the move "further separates Microsoft developers from Java developers. I'm sure there will be third-party JVMs, and I wouldn't be surprised if a groundswell forces [JVMs] back in."

Microsoft claimed in published reports that the removal of the runtime from Windows XP opens the door for third-party providers to step in. Tom Keough, a spokesman for Dell Computer Corp., said bundling a JVM "is something we'll consider. It's on the table."

"The world doesn't work the way it did five or 10 years ago," Harrah said. "It's incumbent upon Microsoft to integrate into a Java environment—not the other way around. Java is here and now." ▮

BORLAND, RATIONAL UPDATE JAVA SUITE

BY ALAN ZEICHICK

Borland Software Corp. has teamed with Rational Software Corp. to release an updated Java development suite containing both companies' products.

The new Enterprise Studio for Java, scheduled to ship at the end of July, includes Borland's JBuilder 5 development environment for Windows and a development-only version of AppServer 4.5 J2EE-compliant application server. Rational's contribution is the Rose Professional J UML modeler and the Rational Unified Process. The per-seat price for Enterprise Studio has been set at $4,699.

The suite is essentially the same as Borland's older Enterprise Studio, Java Edition, which the company introduced earlier this year. The biggest changes are the inclusion of JBuilder 5 instead of JBuilder 4, inclusion of the Rational Unified Process, and lowering the per-seat price from $6,999.

Borland also is offering a $5,199 bundle of the Enterprise Suite that includes Macromedia Inc.'s Dreamweaver Ultradev IDE, which can be used to develop Java Server Pages applications. ▮

Blueprint Merges Reuse Onto RAMP

Claims portal based on specification that isn't yet a spec

BY DAVID RUBINSTEIN

The good news is that Blueprint Technologies Inc. has made available its new Reusable Asset Mining Portal (RAMP), a browser-accessible user interface for asset repositories, which the company claims is fully compliant with the Reusable Asset Specification.

The bad news is that there isn't a Reusable Asset Specification, at least not yet—although a version of the working spec is available at Rational Software Corp.'s Developer Network Web site. The work toward a UML-based definition of how to build assets for reuse is incomplete, and no standards body has been chosen for possible future consideration—yet in his conversation with SD Times, Michael Burnett, Blueprint's CTO (www.blueprinttech.com), insisted that RAMP is compliant with the specification. "I guess [Blueprint] means they will commit to the standard when it becomes a standard," opined Richard Soley, chairman of Object Management Group Inc., a logical destination for the specification as it is closely tied to the Unified Modeling Language, which OMG oversees. "We'd like to see [the spec submitted to OMG] sooner than later."

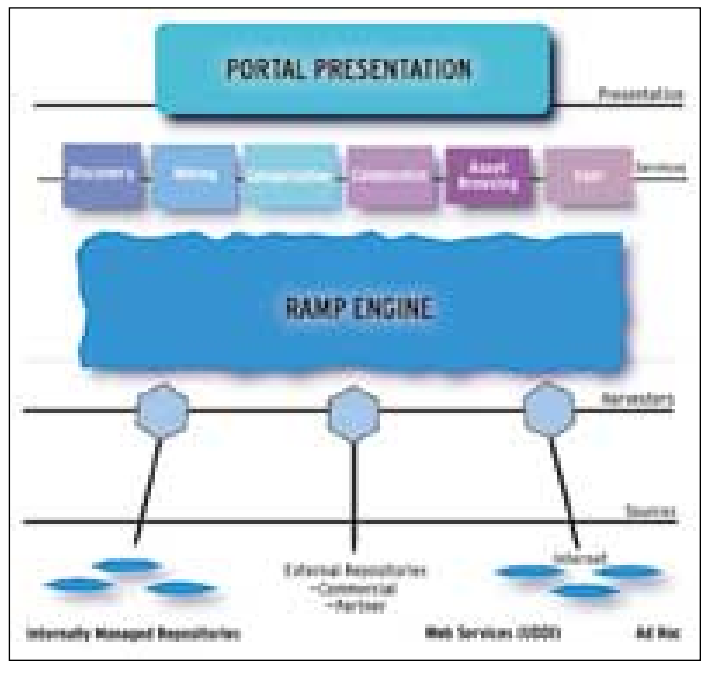
RAMP provides "a window into repositories that facilitates discovery" of an organization's assets or external Web services and UDDI stores, said Blueprint's Burnett, adding that it can front-end both file-based and database repositories. "We're trying to address the issue of reuse and enable reuse, and the market is a lot more ready for it. The time for reuse to become a first-class citizen in enterprise development is now."

RAMP uses an artificial intelligence (AI) indexing engine that allows developers to index and correlate assets during the mining process. Burnett said the benefit of using AI is that "you don't have to build a keyword list for every artifact you want to discover," citing this feature as a key differentiator between RAMP and other asset mining tools. Because of this, he added, organizations don't need to make substantial investments in manually documenting assets in a metadata model.

RAMP also includes an embedded viewer for certain types of assets, such as HTML and Word documents, so that users can view those documents without having to download and open them on their own workstations, Burnett said.

Blueprint's history is as a mentoring and consulting company, and it long had advocated code reuse. At one point, Blueprint sold a developer tool for code reuse, Framework Studio, which Burnett said "no longer was a productive sell. It was based on technology that was bypassed." Blueprint will continue to make Framework Studio available for free.

As for the Reusable Asset Specification, the core members of the RAS consortium—ComponentSource, IBM, Microsoft and Rational—are continuing to work toward finalization, with a possible early September announcement. "There is nonagreement as to which vendor-backed body" the specification will be submitted to, said Wojtek Kozaczynski, Rational's director of architectures and application frameworks. ▮



RAMP's engine allows indexing and correlation of assets during mining process.

Halcyon Days for .NET Migration

Microsoft technology taken to other platforms

BY DAVID RUBINSTEIN

Claiming Microsoft Corp.'s license terms are too expensive and restrictive, software migration and deployment company Halcyon Software Inc. has taken advantage of open standards to demonstrate an implementation of the .NET Framework on other operating systems.

"Microsoft was not aware of our effort until recently," said Don Hsi, Halcyon's (www.halcyonsoft.com) president and CEO, who explained that Halcyon is not licensing .NET from Microsoft. "We didn't want to have to depend on Microsoft. It was part of [Microsoft chairman] Bill Gates' mission statement that .NET be platform-independent, and we've committed to extend our technology to .NET."

Hsi claimed licensing limited Halcyon competitors Mainsoft and Bristol Technologies. Since Microsoft's Common Language Runtime (CLR)—a critical piece of the .NET Framework—has won approval from the ECMA vendor consortium, Halcyon aggressively moved to port .NET to the other platforms.

Hsi explained that Halcyon's migration solution, which will go into beta early next month, works by converting Microsoft's Intermediate Language (IL) to either Java class files or Java source code for execution on multiple platforms. In .NET, developers can write in any of a number of supported programming languages, and the code is then compiled to the IL, then is further compiled as native code for the CLR. Halcyon's first release, targeted at Linux, Mac OS X and Solaris operating systems, will allow for deployment of ASP.NET applications, with support for the complete .NET Framework expected early next year.

Hsi acknowledged that Free Software Foundation Inc., in partnership with Ximian Inc., already is developing an open-source C# compiler, along with a JIT compiler for the CLR and class libraries, under its new Mono Project. Yet, he said, Halcyon decided not to create a runtime or a compiler for each language developers might use to write .NET applications. Hsi said that by compiling the Intermediate Language into Java source code for deployment on multiple platforms, only one compiler is needed, and JVM runtimes already exist for most of those platforms.

Hsi said Halcyon's ultimate goal is to create a plug-in to Visual Studio.NET to allow developers to generate executable code for target platforms, widening the reach of Microsoft developers, while allowing Java developers to manipulate code originally generated in Microsoft programming languages. ▮

Novell Readies NetWare 6

New release includes Apache server, Tomcat engine

BY ALAN ZEICHICK

Remember Novell Inc.? Once the undisputed master of the server operating system, the company's fortunes, market share and mind share have fallen far behind those of Linux and Windows, as well as Unix. But the company's back, with a final beta of NetWare 6 released in late July, and with general availability planned for the third quarter.

The primary focus of NetWare 6 will still be on NetWare's traditional strengths in managing shared files, network printers and user authentication through Novell Directory Services, said Jim Tanner, Novell's director of product management (www.novell.com/products/netware). But the company has made improvements that make the server operating system less intrusive in a heterogeneous network, as well as more attractive to application developers.

Perhaps the biggest piece of news is that the NetWare client, running on users' workstations, will not be required to access services running on NetWare 6 servers. "It no longer relies upon the NetWare client, though it's still supported," said Tanner, adding that the only service that would still need the client is Novell's ZENworks (zero effort networking) tools, which can push application updates and configuration changes out to end-user workstations. Otherwise, he said, clients access NetWare servers using standard protocols, including TCP/IP, CIFS and HTTP. Customers can install NetWare 6 servers onto a LAN, he said, and take advantage of iPrint, its new networking printing scheme, as well as iFolders, a browser-based way of sharing data across a LAN or over the Internet, without having to reconfigure any clients or other servers, other than possibly downloading code as browser plug-ins for accessing specific services.

Tanner pointed out that although NetWare is still promoted as a file/print operating system, it can be used to run application servers. For some time, the company has bundled IBM Corp.'s WebSphere application server with NetWare, but with NetWare 6 the company will be including open-source software instead, including the Apache Web server and Tomcat J2SE servlet engine. The arrangement with IBM wasn't working out, admitted Tanner: The version of WebSphere included with NetWare wasn't current, and neither IBM nor Novell was making money off the arrangement, he said. Novell also is evaluating the feasibility of including an open-source application server, such as Enhydra.

Tanner said that Novell is under no illusion that it can displace other platforms as an Apache host in non-NetWare shops. "If you came to me and said, 'I'm looking for a platform to run Apache,' it would probably be Linux, and I'd recommend Linux," he said. But along with NetWare 6, Novell is unveiling a new licensing scheme in which the only fees for NetWare are for clients authenticated to the server's own security model, or that use its file/print services—and there is no per-server cost. Once a business is a paid NetWare customer, he said, there is no incremental cost for deploying more servers. ▮

News Briefs

COMPANIES

An agreement between **CrossWorlds Software Inc.** and **Filenet Corp.** will allow Filenet to incorporate CrossWorlds' business integration management technology into Filenet's Brightspire collaborative commerce application platform. Availability is promised by the end of September . . . A partnership between **Data Junction Corp.** and **Eldan Software Ltd.** will allow Eldan's NCade Web-based integration framework to use Data Junction's XML IDI (Internet Data Integration) connections to deliver to customers of both companies an end-to-end managed integration environment for B-to-B exchanges, application service providers and Internet trading partners . . . **Sun Microsystems Inc.** and **Hewlett-Packard Co.** have both released code to the open-source community. Sun added 500,000 lines of its Grid Engine Project that distributes computing resources. HP released CoolBase, a set of components that developers can use to create mobile e-services compatible with its CoolTown wireless platform . . . **Versata Inc.** and **Rational Software Corp.** are integrating Versata's business logic development methodology with Rational's Unified Process based on the UML standard. Versata also plans to update its connectivity with Rational's Rose modeling tool later this year.

PRODUCTS

I-Logix Inc. has developed a **QNX Neutrino** adapter interface that lets developers using the Rhapsody UML-based development platform write applications for QNX Software Systems Ltd.'s real-time operating system . . . Mortice Kern Systems Inc. has released **MKS Integrity Manager 4.2** that integrates with **MKS Source Integrity Enterprise Edition 8.1** to manage enterprise software changes. New features in 4.2 include integration with Microsoft Project 98 and 2000, improved process management for software development, enhanced permissions management, improved user information customization and new client/server support . . . Cape Clear Software Inc. has released the beta of **CapeStudio**, a rapid application development environment for creating applications that use Web services . . . VMWare Inc. has unveiled a Windows version of its **GSX Server**. GSX allows a single server to run multiple instances of Windows simultaneously; previously, it had been available only for Linux . . . Aladdin Systems Inc. is offering Linux, Solaris and Windows versions of its **StuffIt Engine SDK** compression/decompression program that supports Zip, Gzip, tar, UUencode Unix Compress, BinHex, MacBinary and other file formats . . . Borland Software Corp. has released free versions of its **JBuilder 5**, **Delphi 6** and **Kylix** IDEs. Those new versions are licensed for individual, noncommercial use . . . Thought Inc. has integrated its **CocoBase Enterprise O/R** mapping tool to run inside JBuilder 5; it can now be accessed from the JBuilder 5 toolbar . . . Fuegotech Inc.'s new **FuegoBPM 4.0** improves upon its business process management system by featuring multidimensional analytical capabilities that use OLAP, new tools for letting users integrate new data and application, and an enhanced security model . . . Altova Inc. has released beta 2 of its **XML Spy 4.0** development program. The new version includes a documentation framework and an XSLT style sheet generator . . . eHelp Corp.'s **RoboHelp Office 9.2** lets developers use Microsoft's Word 2002, a component of Office XP, to develop help files. The $899 software also is offered as a $99 upgrade for RoboHelp 9 users, or $499 for users of older versions of RoboHelp . . . Enhancements to Pragmatic Software Co.'s **Defect Tracker 3.6** include improvements to T3 lines, check-in/check-out features for shared documents, the ability to upload multiple documents and Web site links at one time, an improved edit screen, and the ability to attach notes and files . . . Metagenix Inc. has released a scaled-down version of its MetaRecon data analysis tool, called **MetaQuick,** which provides all the major features of MetaRecon, such as reverse-engineering metadata like data types, cardinality, nullity, precision, scale and constants, and creates a variety of predefined reports for data quality assessment. It is priced at $5,000 . . . Merant Inter-

▸ continued on page 19

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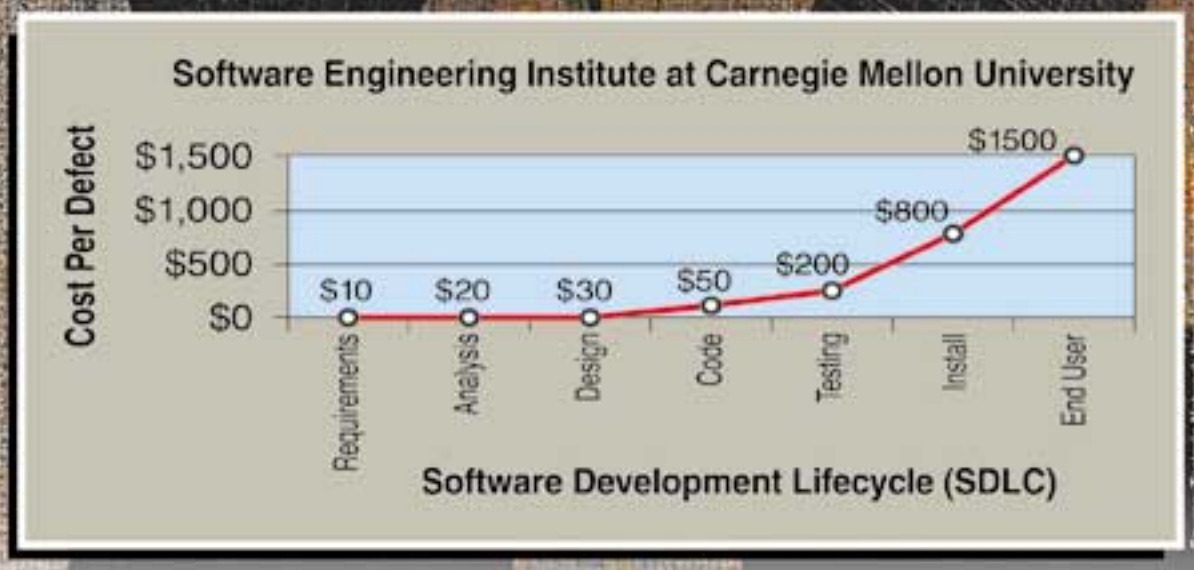

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Changing Times Call For New Tools of Change

Merant manages mainframe, distributed code

BY DAVID RUBINSTEIN

Looking to differentiate itself from a crowded change-management market, Merant International Ltd. has added Web content management to its traditional source-code tool in the seventh iteration of its PVCS Dimensions enterprise-change-management suite.

Merant has integrated the content-management capability it picked up in February with the acquisition of the enterprise division of NetObjects Inc. into the latest version of Dimensions. Further, Merant claims that by supporting OS/390 with Dimensions 7.0, this is the first change-management system to unify mainframe and distributed application management. This is critical, according to Merant CTO Andrew Weiss, because organizations that can automate change in the development and content-deployment environments gain a competitive edge with higher-quality software and content that is less costly and time-consuming to maintain.

"Enterprise change management is especially important for Web sites with transactional capability, and this can be extended to how people do human resources updates on their intranets," Weiss said. "It's a pretty wide-ranging solution."

Even as he acknowledged that the change-management market is loaded with vendors, Larry De'Ath, Merant's vice president of communications, said that penetration is low in the Web-content-management area. "Over 80 percent of the potential market has built a roll-your-own solution," he said. "Can you manage your assets with a cobbled-together solution? We don't think so."

"The competition has separate products with temporary integration," added Weiss, referring to change-management offerings from Rational, Serena and Starbase. "They try to apply source-code management to Web objects, but the users of WCM are different users. They don't cotton to engineering that developers use."

Merant also is delivering the services and collaboration tools offered through its Merant ASAP hosting service to companies that want to use it behind their own firewalls, Weiss said. "In the ECM development space, we're the only ones offering this. Rational only delivers a developer portal."

Merant (www.merant.com) has taken steps to hone its core divisions—PVCS enterprise change management and DataDirect data components. The company had previously attempted to pull all of this together under the Egility umbrella, which included the above as well as a third division, MicroFocus, which housed tools for legacy-to-Web code transformation. But Merant recently scrapped the Egility brand and last month won shareholder approval to sell its MicroFocus division, which included the AssetMiner rules extractor tool and the NetExpress rules-to-EJB converter released only last fall, to a venture capital fund.

"People felt that something that fuzzy wasn't going to be a buy," Weiss admitted. "Now we're refocusing on the two divisions."

According to De'Ath, the division was profitable, but its projected growth rate was not on par with the ECM and data component products. "This gives us a better chance of being successful moving forward," he said.

PVCS Dimensions 7.0's pricing starts at $3,200 per developer seat. ▮

Headway Improves Code Viewer

BY ALAN ZEICHICK

Looking for an effective way to distribute the source code for an application so that your customers can easily understand how the application works? Headway Software Inc. believes that it can bring Adobe Systems Inc.'s Acrobat model to source-code documentation through its reView Publisher Edition and freeView source-code reader.

For some time, the Dublin, Ireland-based Headway has sold reView, a Windows-based source-code visualization program that the company markets to development teams for their internal use. ReView graphically shows the interdependencies within the C++ or Java source code, according to the company, from applications and packages down to classes, methods and data members.

The new Publisher Edition, available free of charge to any company that signs up as a Headway partner, is targeted at companies that distribute their source code to customers, and also at open-source projects. The source code generated through the Publisher Edition can be viewed, on a read-only basis, using freeView, a program Headway offers for free download from its Web site (www.headwaysoft.com). "It's based on the Adobe Acrobat Reader model," according to company spokesperson Julie Szabo.

Headway also has released a Java version of reView for beta testing, which the company says will run on Linux, Solaris and Windows clients. The Java version is priced at $999 per client; a date for general availability has not been set. ▮

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Documentum Joins Web Services Fray

BY CHRISTINA M. PURPI

The changing of the guard usually brings about more changes down the line. Such is the case with Documentum Inc., as Dave De Walt takes over as CEO from the retiring Jeffrey Miller. Already under De Walt's brief reign, the company has started to outline changes to its business and marketing strategies.

Historically positioned as a provider of content-management tools, Documentum has announced its newest vision, "Ecotecture," which states that "all content must be united with applications in a fast, transparent manner." The Content Ecotecture "is the ultimate goal of standards-based applications and such industry trends as Web services."

To achieve this vision, Documentum (www.documentum.com) has begun to implement eContent Services, an add-on to its 4i eBusiness Platform that sits atop an application server and enables enterprises to develop, manage and share content-rich applications. These services are a series of components that developers can embed into their own applications.

In a succession of product and partnership announcements, Documentum will continue to reveal the remaining pieces of its plan through October.

The plan, noted by De Walt, is to deliver eContent Services in a phased approach, starting with eContent Services for Portals, while extending standards to support J2EE, .NET, XML, SOAP and WSDL. These portlets allow applications to talk to one another, while delivering content through a portal interface. The first phase of Portlets is expected to be available in October and will include content-management functions that can be integrated with portal deployments. During the next month and a half, Documentum will be announcing portal partnerships, some of which already include BEA Systems Inc., EpiCentric Inc. and PlumTree Software Inc.

In a market that is expected to reach the billions of dollars by 2004, De Walt sees a "rich opportunity to take a leadership position and some market share away from our competitors," whom he identified as Interwoven Inc. and Vignette Corp. De Walt said he would like to have Documentum own 50 percent of the enterprise-content-management market. His claim that Documentum currently owns 25 percent to 35 percent of the market could not be independently confirmed.

In past years, Documentum's entire product line consisted of J2EE and Java content-management tools. Now, according to De Walt, customers want to be able to deploy their applications to multiple client devices.

To introduce its new market position and marketing initiative, Documentum will be holding its first-ever Documentum Developer Conference from Sept. 10 to Sept. 13 at its Pleasanton, Calif., campus.

De Walt, former COO, was promoted to the CEO position July 19 and has officially taken over the post. He replaces Miller, who has retired but will continue to act as chairman. ▮

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Mac OS X

An Overview for Developers

With Mac OS X, Apple asserts its leadership in the advanced technologies and design sensibilities that are the hallmarks of any great operating system.

Mac OS X is a completely rebuilt implementation of the Macintosh operating system. It expands on Apple's technological strengths, such as industry-standard networking capabilities and industry-leading user interface design.

More importantly, Mac OS X combines those strengths with support for a variety of technologies beyond those typically associated with the Macintosh, such as UNIX and Java 2 Standard Edition. This unique combination of technologies offers developers stability, power, and interoperability, beneath a well-designed, elegant, and intuitive user interface. As a result, Mac OS X presents new opportunities for both development and deployment.

Darwin

The stability of Mac OS X begins with Darwin, the open source core of the system. Darwin integrates a number of technologies, including the Mach 3.0 kernel, operating system services based on BSD UNIX, high-performance networking facilities, and support for multiple integrated file systems. Further, Darwin's modular design lets developers dynamically load such things as device drivers, networking extensions, and new file systems.

Apple and Open Source

Apple is the first major computer company to make open source development a key part of its ongoing software strategy. The core of Mac OS X, Darwin, is itself an open source project. This approach to operating system development allows developers and students to view the Darwin source code, learn from it, and submit suggestions and modifications. Developers can participate in the Darwin open source project by signing up at: **http://www.opensource.apple.com**

Darwin's advanced memory protection and management system ensures reliability by allocating a unique address space for each application or process. The Mach kernel augments virtual memory semantics with the abstraction of memory objects. This enables Mac OS X to manage separate application environments simultaneously, while presenting users with a seamless experience.

Darwin also supplies the following advanced functionality:

- Preemptive and cooperative multitasking.
- Symmetric multiprocessing (SMP) augmented by support for multithreading.
- Real-time support guaranteeing low-latency access to processor resources for time-sensitive media applications.
- An object-oriented device driver programming framework called I/O Kit.

Graphics System

Mac OS X combines three powerful graphics technologies, Quartz, OpenGL and QuickTime, enabling developers to push graphics beyond anything users have seen on a desktop operating system.

Mac OS X system architecture

Quartz

Quartz is the foundation of the Mac OS X imaging model. It is comprised of a high-performance, lightweight window server and a graphics rendering library for two-dimensional (2D) shapes. The window server features such advanced capabilities as device-independent color and pixel depth, layered compositing, and buffered windows for the automatic repair of window damage.

The Quartz rendering model is based on the cross-platform Portable Document Format (PDF) standard, enabling developers to easily embed and manipulate PDF data within any Mac OS X application. This yields such benefits as automatic PDF generation and save-as-PDF, automatic onscreen preview of graphics, conversion of PDF data to printer raster data or PostScript, and a consistent feature set for all printers.

The layered compositing engine used by Quartz allows developers to create unique onscreen effects. It replaces the "switch model" of traditional windowing systems with a "video mixer" model in which every pixel on the screen can be shared among windows in real time. This model allows for smooth transitions between the states of the graphical user interface.

Quartz also provides developers with these advantages:

- On the fly anti-aliasing of graphics and text enabled by the use of a floating-point coordinate system and high-precision vector processing.
- Direct access to the video frame buffer.
- Automatic detection of and benefit from the floating-point coprocessing performed by the Velocity Engine in PowerPC G4 microprocessors.

OpenGL

For three-dimensional (3D) graphics, Mac OS X features an optimized implementation of industry-standard OpenGL. OpenGL is one of the most widely adopted graphics standards today, making code written to OpenGL extremely portable and making generated visual effects highly consistent. It is specifically designed for games, animation, CAD/CAM, medical imaging, and other applications that need a rich, robust framework for visualizing shapes in two and three dimensions.

QuickTime

Mac OS X comes packaged with the latest version of QuickTime, a powerful multimedia technology for manipulating, enhancing, and storing video, sound, animation, graphics, text, music, and even 360-degree virtual reality. It also allows streaming of either live or stored digital video. As a cross-platform technology, QuickTime can deliver content on Macintosh and Windows systems. Augmenting its cross-platform capabilities, QuickTime supports every major file format for images and every significant professional file format for video.

Through the QuickTime plug-in, QuickTime's digital video streaming capability is extended to all popular web

browsers. The plug-in supports over thirty different media types and makes it possible to view over 80 percent of all Internet media. QuickTime also features other advanced web streaming capabilities, such as movie "hot spots" and automatic web page launching.

User Interface

The most visible expression of Mac OS X power and technology is its new user interface, Aqua. Apple applies its leadership in user interface design to Aqua, incorporating many of the qualities and characteristics Macintosh users expect, while adding advancements to benefit expert and novice users alike. Ease of use is factored into every feature and capability.

Consistent with Apple's design philosophy, visual enhancements serve not just as beautiful images, but as cues to the functionality and operation of the system.

A prime example of this user-focused design is the use of "sheets." These non-modal dialog boxes attach directly to the title bar of the relevant document, intuitively linking document and action. The non-modal nature of sheets prevents applications from hijacking the system and interrupting user workflow.

Interoperability

Mac OS X makes unprecedented use of technologies and standards that allow interaction with other platforms. This affords both developers and users the opportunity to use Macintosh computers in new places and in new ways. Mac OS X manages multiple file and networking formats and supports a wide range of industry-standard protocols. Based on an enhanced VFS design, the file system supports multiple local formats and complies with POSIX file system semantics.

Hardware connectivity is simplified through built-in support for Ethernet (10/100/1000Base-T); serial connections for modems, ISDN, DSL; wireless networking through AirPort (IEEE 802.11); USB (Universal Serial Bus); and FireWire (IEEE 1394).

Java 2 Standard Edition

Mac OS X ships with a complete implementation of Java 2 Standard Edition (J2SE) version 1.3, including the HotSpot client virtual machine. Benefits of Apple's Java implementation include access to Aqua user interface elements "for free" through Swing, native preemptive multitasking, automatic multiprocessing support and management of JAR files as shared libraries.

This last advance improves the speed of execution and reduces the RAM footprint of applications which rely on the same archive, such as applications within suites. Mac OS X also plugs the Java windowing toolkit more directly into the Mac's native windowing toolkit, giving Java applications and applets the graphics performance benefits of Quartz.

Backward Compatibility

To afford users a gentle migration path, Mac OS X builds on Darwin's ability to manage multiple application environments simultaneously. The Classic environment is actually a full version of Mac OS 9.1 running in a protected memory space under Mac OS X. As a result, most Mac OS 9 compatible applications will run side-by-side with Mac OS X applications.

Additionally, developers can code for Carbon, a native Mac OS X environment that allows programmers to take advantage of advanced Mac OS X features while retaining compatibility with the installed base of Macintosh computers running Mac OS 8.1 and later.

Development Options

There are multiple ways to develop for Mac OS X. Individual skills, preferred languages and tools, target user base, and time to market concerns will influence a developer's approach:

Carbon

The Carbon APIs are based on earlier Mac OS APIs. While Carbon allows applications to take advantage of Mac OS X features such as multiprocessing support and the Aqua user interface, Carbon is specifically designed to allow compatibility with older versions of the Mac OS.

Cocoa

The Cocoa application environment runs natively under Mac OS X. For those who wish to develop for Mac OS X using rapid application development (RAD) tools and object-oriented techniques, the Cocoa frameworks provide a fast and complete way to do so. These frameworks offer both Java and Objective-C APIs.

Java

The Java application environment allows development and execution of Java programs on Mac OS X, including 100% Pure Java applications and applets. The J2SE implementation in Mac OS X is designed to allow maximum Java application portability. Developers can also use the Java development language to write a Cocoa application, allowing Java programmers to use a familiar language to develop for a new platform.

UNIX

Since Mac OS X is built atop a UNIX kernel, porting UNIX-based applications to the platform is relatively easy. This enables enterprise-level UNIX products to enjoy parity with consumer and business applications on a commercial desktop platform.

Mac OS X offers opportunities for developers from many different backgrounds to port and build innovative and compelling applications.

And the best way to get started is with the Apple Developer Connection:

Apple Developer Connection membership programs offer benefits such as prerelease software seeding, code-level technical support, news and technology updates, and discounts on business support services. Developer documentation and resources are available free at **http://www.apple.com/developer**.

To learn more about developing for Mac OS X, visit the Mac OS X development website at **http://developer.apple.com/macosx**.

To request a free **Programming for Mac OS X CD-ROM** containing tutorials, sample code, and technical documentation designed to provide step-by-step descriptions of the methods developers can use to create Mac OS X applications, visit **http://developer.apple.com/sdtimes.html**.

ADC
Apple Developer Connection

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JMS Courier Integrates Java With C++

BY DOUGLAS FINLAY

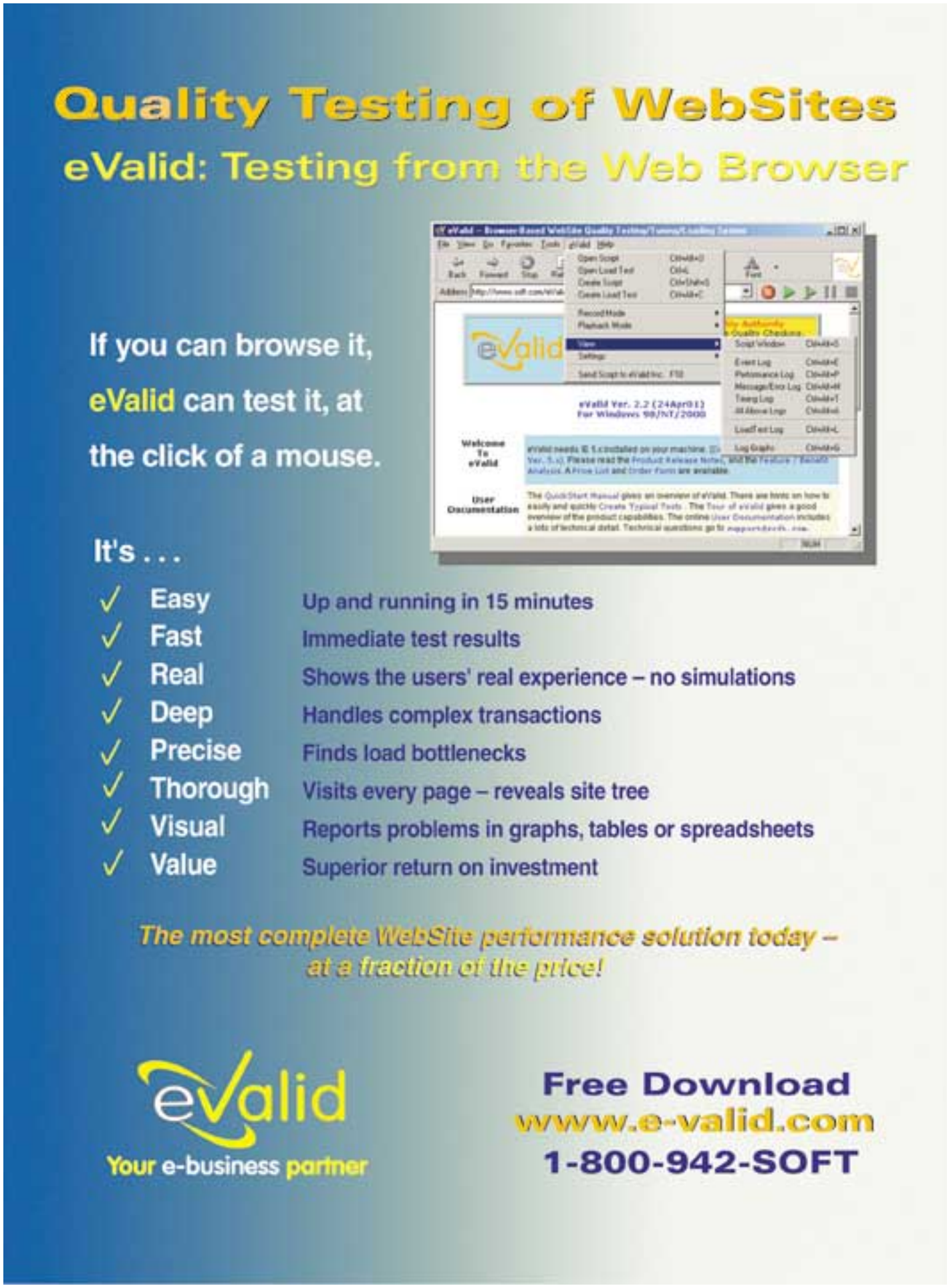
Development shops needing to tie C++ applications into Java Message Service have a new integration tool: Codemesh Inc.'s JMS Courier 1.0.

"JMS Courier is a program that integrates Java Message Service with C++ code," said Alexander Krapf, Codemesh's (www.codemesh.com) president. He said problems often stem from developers' having message queues or other products that have a JMS interface that they'd like to use but can't because they are not exclusively a Java shop. "It can be a big problem for them because of large amounts of C++ code they have that they can't integrate into Java," he said.

Because of a lack of integration between Java and C++, Krapf said, developers often "use proprietary interfaces, which lock them into the vendor, or go to the Java Native Interface (JNI), which is incredibly fragile and complex to use, or they use CORBA, which leads to deployment hassles because they need to deploy a Java ORB and a C++ ORB just to get across the language barrier."

Instead, Krapf said JMS Courier is a C++ class library that exposes the entire JMS API to C++ to enable integration of Java and C++. He said it would work with virtually any vendor's JMS implementation, and a C++ programmer could just code to the C++ API with little problem because "there is such a close mapping to the underlying Java API that the C++ programmer can use Java documentation to learn about it."

JMS Courier costs $2,495 per developer seat, and runs on Solaris and Windows. ▮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Rational's ClearQuest Goes MultiSite

BY CHRISTINA M. PURPI

Rational Software Corp. is expanding its ClearQuest defect-tracking system with the creation of a new add-in, called ClearQuest MultiSite, which the company says allows ClearQuest to track defects and source-code changes across geographically distributed sites, keeping the records synchronized among the different locations.

The release of ClearQuest MultiSite parallels a similar multisite add-in that Rational recently introduced for its ClearCase software-configuration management system, called ClearCase MultiSite. ClearQuest MultiSite is available now and is priced at $995 per seat for a floating license, and $395 for a node-locked license.

The company will also be packaging together its Purify, Quantify and PureCoverage runtime analysis tools into a $8,995 suite called PurifyPlus. Through the suite, which runs on Unix and Windows, developers can have a common interface for analyzing applications written in C/C++, Java and Visual Basic.

Rational also announced that its ClearCase LT OEM is now integrated with IBM Corp.'s WebSphere Business Integrator v2.1 to give customers access to the change-management solution from Rational and be able to store artifacts in a common repository for its WebSphere applications. ▮

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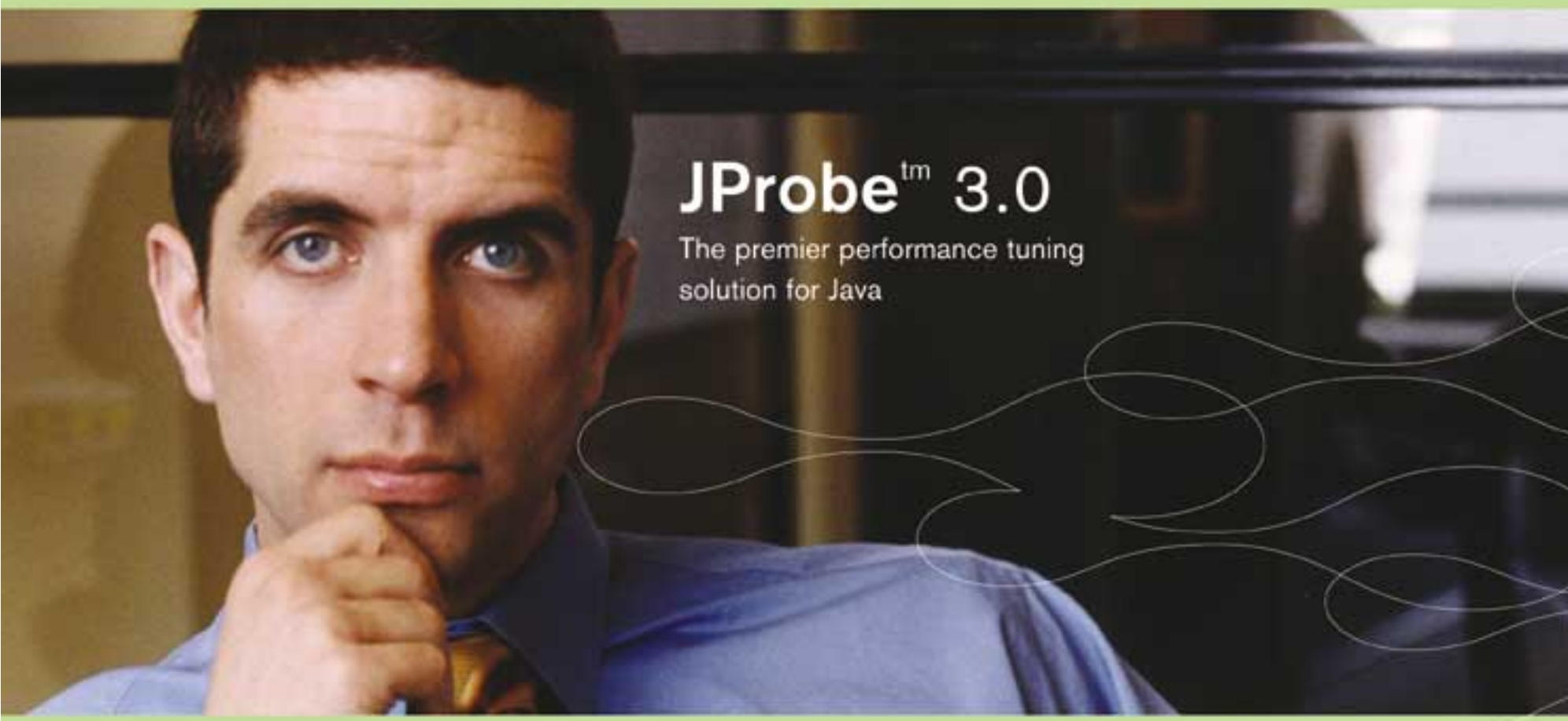

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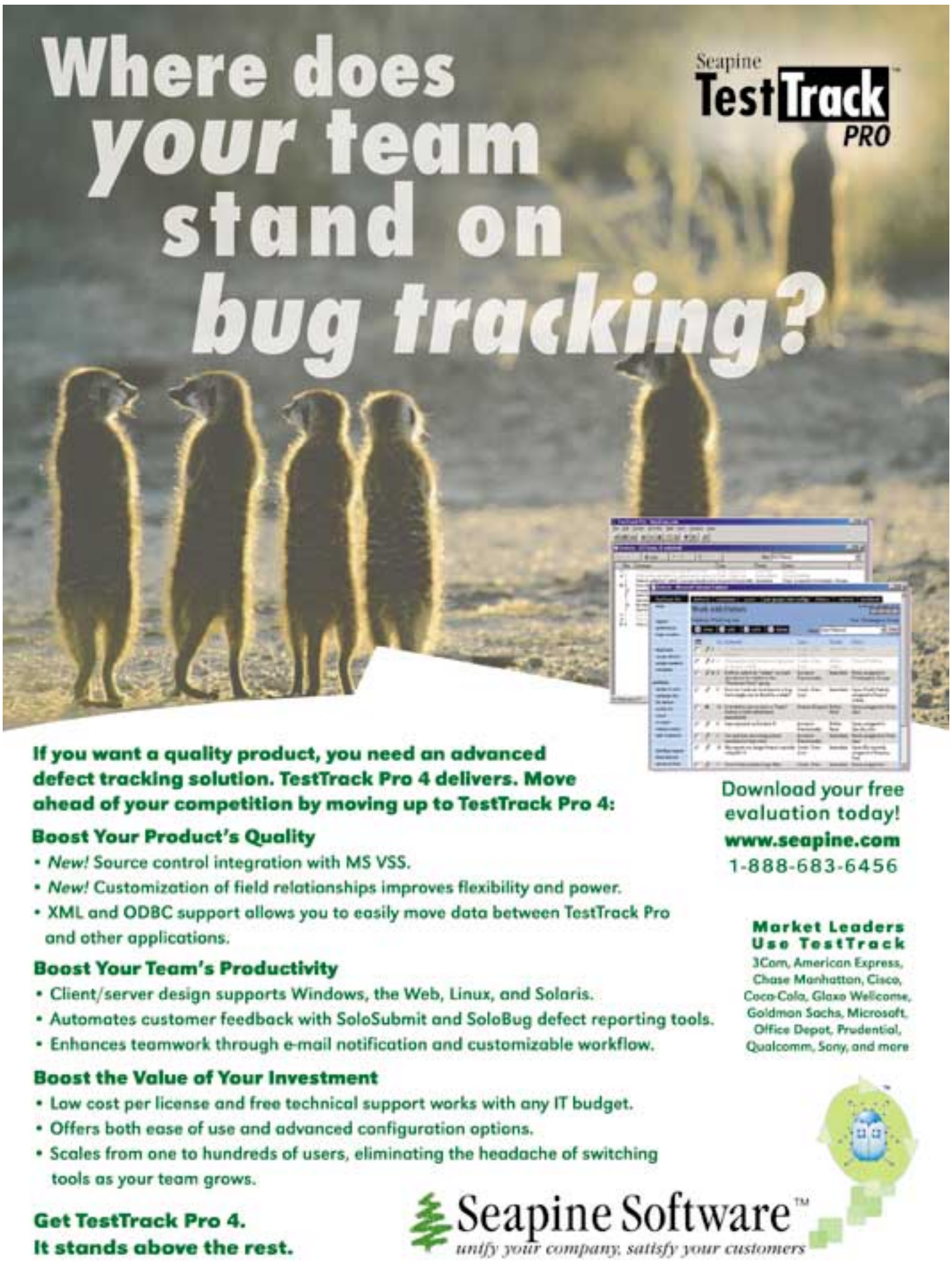
IBM Proposes Reliable HTTP Message Standard

BY DOUGLAS FINLAY

IBM Corp. is proposing a reliable messaging specification at the basic HTTP level that reaches beyond those available, or to be offered soon, in other specifications such as ebXML and SOAP. The draft specification, called Reliable HTTP (HTTPR), can currently be found at IBM's developerWorks Web site (www.ibm.com/developerworks/webservices/library/ws-phtt).

"The proposed standard specification is an add-on to the HTTP 1.1 specification and will allow for reliable messaging over the protocol," remarked Scott Cosby, IBM's manager of e-business technologies marketing, adding that there is currently no specification available on the Internet to handle reliable point-to-point messaging. He defined reliable messaging as having the ability to acknowledge that a message has been sent properly once, without the need to resend the message.

Cosby said that while there are proprietary reliable messaging programs available from individual vendors, as well as integrated into emerging specifications such as ebXML, the "HTTPR specification is aimed at HTTP, and around Web services, where there needs to be an open protocol that is independent of any other software implementations." He said that using reliable messaging in ebXML, or that proposed in SOAP, would necessitate developers using that environment to take advantage of it. ▮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WRQ MOVES HOSTS TO XML

BY ALAN ZEICHICK

Developers who need to process host data with desktop applications may be interested in the latest release of WRQ Inc.'s Reflection host-emulation software. In addition to offering the usual green-screen emulation, Reflect 9 will be able to capture and exchange mainframe, minicomputer and other big-iron data into XML format, for integration with local Windows desktop applications, according to the company.

The new version, currently in beta, is promised for general availability on Sept. 3, said Sue Lindsey, WRQ's product manager for Reflection (www.wrq.com/products/reflection). The price of the new software will remain $114 per seat with volume discounts.

Lindsey said that although there are other changes in this new version, including tighter integration with Microsoft's Visual Basic for Applications, Windows 2000 certification, a new Kerberos security client and improvements to SSL/TLS Telnet encryption, the biggest change is the XML integration.

"We don't want people to get stuck with proprietary technologies," Lindsey said, adding that increasingly, terminal emulation is about more than providing a Windows desktop front end to mainframe, minicomputers and Unix servers. "We've begun to allow developers to download information from the host and share it with other applications using XML. They can make data on the host integrate with applications on the desktop." ▮

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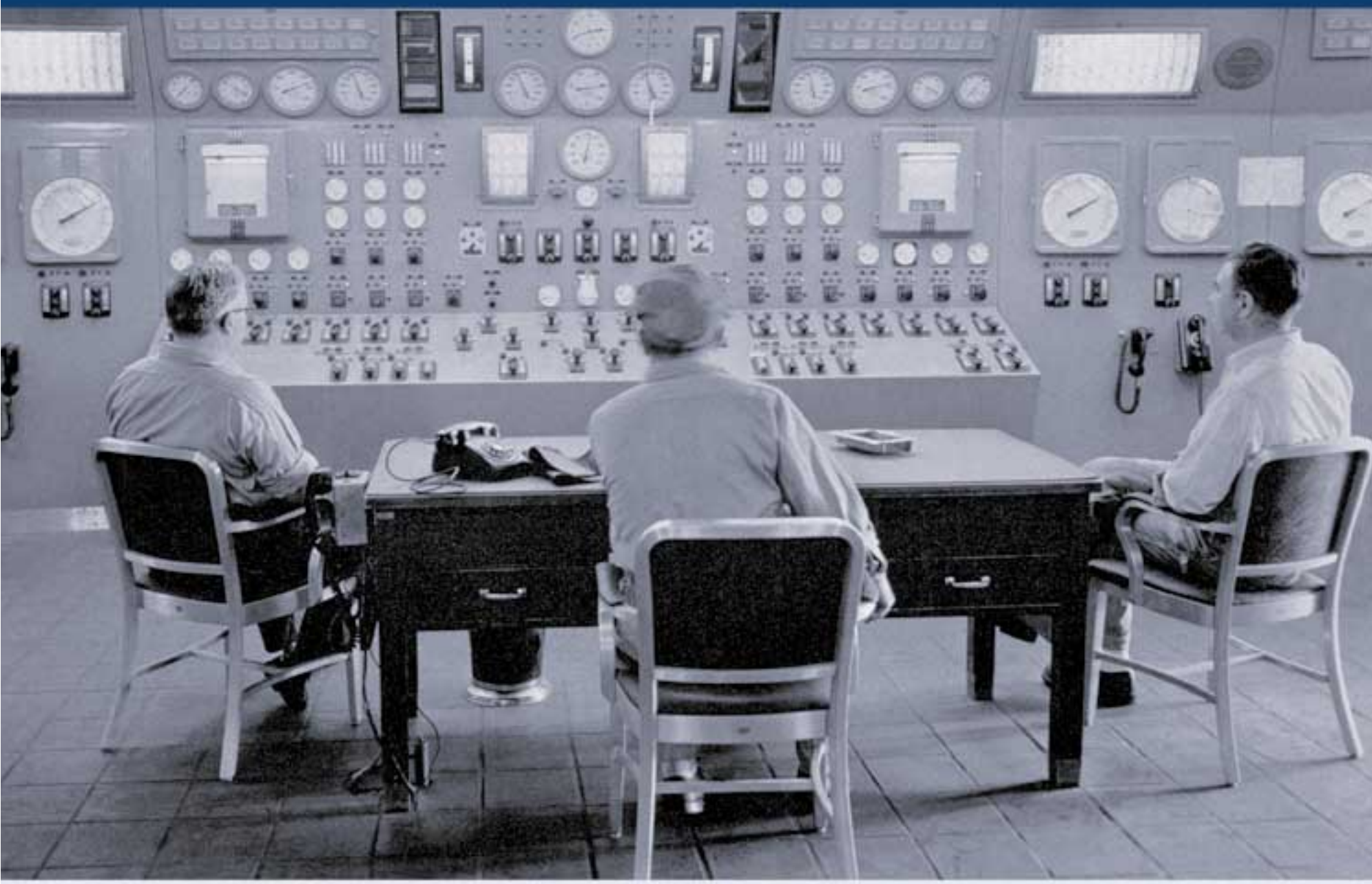

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SUN

◂ continued from page 1

improvements to EJB interoperability. "Finally! We've been pushing them quite hard for a while, as has a lot of the Java community, and we're glad they're doing it." ComponentSource (www.componentsource.com) develops and markets roughly 6,500 software components, of which only about 10 percent are EJBs.

Patterson said EJBs have been long on promise and short on delivery. "One of the barriers [for developers] who create components is making them work across a variety of app servers," he said, adding that the problem has been that the EJB specification left too much to interpretation.

Sun's Lilienfeld said that IIOP solves this problem. "Portability, which is the cornerstone of J2EE, is manifested [in the new specification], and now can be used in a production environment. You can even have an EJB talking to a non-Java component" as long as that component is talking IIOP, which she said is the equivalent of CORBA 2.3 protocol.

But Patterson wants more. While the interoperability problem is a substantial one, "there are some bigger issues—like built-in licensing support—so that component authors can protect their intellectual property. You have it on the Microsoft side with ActiveX and .NET; why not on the Java side?"

Ralph Galantine, Sun's product line manager for J2EE, said that the JCP would be the proper venue for bringing these types of proposals forward "because it would take industry commitment and adoption," he said, adding that JCP proposals become public at a certain stage, and that no such proposal is currently in a stage that can be commented on. "We would invite ComponentSource to bring that forward," he added.

When asked if Sun planned to implement a compliancy certification program similar to those of its J2EE application servers, Galantine said, "There's an opportunity in the JCP to do some sort of compliancy stamp, but there's nothing to announce." ▮

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CORBA GETTING JMS CONNECTION

BY DAVID RUBINSTEIN

Object Management Group Inc. is soliciting proposals for a CORBA–Java Message Service connection specification that it hopes will ease asynchronous communication between the two worlds. The first implementation is expected either late this year or early next year.

According to Tom Urquhart, the spec lead from Prism Technologies Ltd. (www.prismtechnologies.com), there is a need in enterprise shops for communication between new applications built to the J2EE specification and legacy CORBA applications. While OMG's Java-to-IDL (Interface Definition Language) mapping and the IIOP (Internet Inter-ORB Protocol) support required in the forthcoming J2EE 1.3 specification from Sun Microsystems Inc.'s Java community both address the messaging problem, Urquhart said, "more flexible interworking requires a higher-level approach—for example, integrated directories, integrated transactions and especially integrated messaging."

OMG's current standard for asynchronous publish/subscribe messaging is the Notification Service, while J2EE utilizes the Java Message Service. The new OMG RFP asks for input to link the two. ▮

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GenX 1.5 to Run Wizards From the Command Line

DevelopMentor also releases COM+ Wizard Pack

BY EDWARD J. CORREIA

DevelopMentor Inc. has released to beta GenX 1.5, its knowledge proliferation and code reuse add-on for Microsoft Visual C++. Separately, the company released the COM+ Wizard Pack, which it claims greatly simplifies development of components for Microsoft's COM+ runtime service.

Command-line execution automates code generation, says DevelopMentor's Lilly.

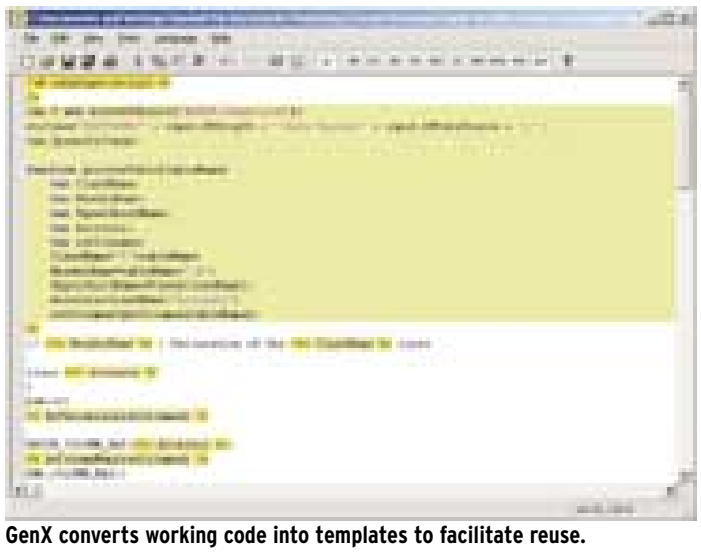
GenX (www.developmentor.com) facilitates code reuse by letting developers turn blocks of working code into templates that can then be distributed to other developers and easily modified through customizable wizards. Most significant in the new version will be the ability to execute those code-generation wizards from the command line.

According to Lauren Lilly, GenX's product manager, running a wizard from the command line can be used to automate parts of the development process. "When the database schema or XML schema changes, or when the template changes, you need to regenerate the code." By placing a wizard call in a makefile, the process is automatic, he said. The single-user version of GenX will sell for $795; the team version will be available for $995.

The recently released COM+ Wizard Pack contains a set of wizards that will automatically generate COM+ components based on Microsoft's Active Template Library (ATL). Available now, the COM+ Wizard Pack sells for $295 for existing GenX users, or $395 with a GenX runtime.

"When you're developing COM+ components, it's very complicated to match them up with the right MTS [Microsoft Transaction Server] packages" because of all the possible variations, Lilly said. "What we do is present the developer with a list of the possible choices and let them pick and choose. And if they make a dumb choice, we say, 'Dumb choice. This one might be better.'"

The alternative for developers looking to use wizards to build COM+ objects, Lilly said, is to use Microsoft's aging MTS wizards to create MTS objects and then convert them to COM+, which he said is not efficient. "They will run, but they don't run as efficiently and don't have all of the options available." Components also can be deployed in the COM+ catalog by inserting class-specific data into an ATL server's configuration script. ■



GenX converts working code into templates to facilitate reuse.

News Briefs

MORE PRODUCTS

◂ continued from page 4

national Ltd. has made available the **DataDirect Connect JDBC 2.10** driver, which it says is the first Type 4 JDBC driver to connect J2EE applications to DB2 on OS/390 and z/OS . . . Bull Infrastructure & Systems Inc. announced a connection tool set, **HooX**, for legacy-system integration within BEA's WebLogic application server. HooX, or Host Object-Oriented Connections, is based upon the J2EE 1.3 Connector Architecture for connecting back-end applications with a J2EE-compliant app server . . . Serena Software Inc.'s **ChangeMan for z/OS and OS/390** change-management system now works with IBM's **WebSphere Studio Asset Analyzer**, a new tool that provides a framework for connecting applications between the mainframe systems and J2EE platforms.

PEOPLE

Eric Goldfarb has joined IT education company Global Knowledge Inc. as its CTO. Previously, he was CIO/CTO of MacMillan USA . . . **Peter Micciche** has been named president and CEO of Kinecta Corp., where he will report to chairman **David Mathison**. Micciche was formerly ChannelPoint Inc.'s senior vice president of sales and marketing . . . The Organization for the Advancement of Structured Information Standards has elected the following new board members: **Colin Evans**, Intel Corp.'s director of e-business standards; **Jim Hughes**, Hewlett-Packard Co.'s software organization director of standards; **Christopher Kurt**, Microsoft Corp.'s group program manager; **Simon Nicholson**, Sun Microsystems Inc.'s industry initiatives manager; and **Michael Weiner**, IBM Corp.'s e-business industry standards liaison.

STANDARDS

Sun Microsystems Inc. has put into practice **ebXML's Registry/Repository 1.0 Implementation**, which stores, retrieves and manages resources to facilitate ebXML-based B-to-B partnerships and transactions . . . The IETF's Internet Engineering Steering Group has approved the draft **"MIME Security for OpenPGP"** for standardization. The new standard defines a MIME encapsulation for the Open PGP message format . . . W3C has advanced **Scalable Vector Graphics 1.0** to a proposed recommendation for review. SVG enables line art and other two-dimensional vector graphics to be scaled over mobile devices in XML format. In addition, W3C has advanced the **Synchronized Multimedia Integration Language Animation** to a proposed recommendation for review. This subset of SMIL 2.0 puts animation on a time line, permits composition of several animations, and describes animation elements for any XML host language. ■

BPMI'S BPML

◂ continued from page 1

it because they now can be used for specific business processes," said Ismael Ghalimi, chairman of the initiative (www.bpmi.org). He maintained that the seamless connection of BPML to other Web services protocols would permit facilitation of business processes from the back-office systems of several partners to their front-end trading processes.

Mike Gilpin, analyst at the Giga Group, said interfacing BPML to lower-level Web services protocols such as WSDL and SOAP was indeed important because "in integrating a set of Web services together to meet business requirements, what you are really doing is integrating into a business process." He called this integration a new and important view of software that departs from the historical approach of binding functions together to call them applications. "Web services are a more dynamic and flexible medium for binding functions together," he said, "and the business process model is a paradigm that the industry is settling on to bind those functions together."

Ghalimi called 0.5 difficult to develop initially because BPML is essentially a number of multiple activities that can be portrayed as small Web services, or as small WSDL interfaces and SOAP components. "There was no documentation in WSDL that explained how to link together or correlate multiple Web services," Ghalimi said, "so we had to work major additions into the original BPML specification that would tell us how to link and correlate them."

BPML is an attempt to standardize on a language at the highest levels of the Web services stack, Ghalimi said, rather than to standardize on direct business processes. Citing RosettaNet's Partner Interface Protocols (PIPs) as examples of specific business processes in use today, he said standardizing on them is not a purpose of BPML. Instead, he said, "business process vendors could use BPML as a way to describe more advanced protocols and interfaces among partners to provide more business logic, so they could develop better PIPs, and express them in BPML."

Pete Wenzel, RosettaNet's chief architect, said that in looking to the future in building business processes, "we see a need for more complex choreographing for PIP scenarios, so we need to express these scenarios under which different PIPs would be used in part of an overall larger business process." He said BPML may be better suited because it appears to possess a richer ability to express the complex processes that will be required.

BPML COMPETITION

Ghalimi calls BPML the "Java of business processes" because Microsoft Corp.'s XLANG is a competing business process language currently used in its BizTalk Server. He said both languages are essentially the same in that they use an underlying mathematical model called Pi-Calculus as a foundation, but that XLANG uses different semantics. Giga Group's Gilpin believes Microsoft would be more amenable to looking at BPML if it were overseen by a reputable standards group such as W3C.

IBM's Web Services Flow Language (WSFL) also is considered a competing language, yet Ghalimi said it is really an XML scripting language for IBM's MQ Series message program that also provides a simple interface to WSDL. "When 0.5 comes out, WSFL will be considered a subset of BPML," he said.

The ebXML Business Process Specification Schema (BPSS) is another business process language being developed by the Organization for the Advancement of Structured Information Standards. ■

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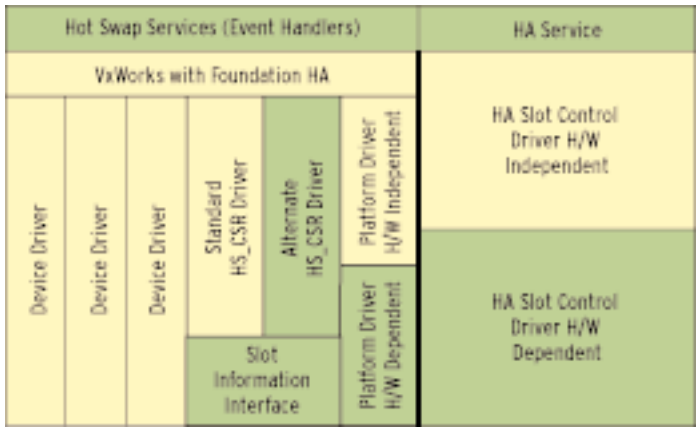
Wind River Releases Foundation HA

Aspires to set new standard for high-availability software in VxWorks RTOS

BY EDWARD J. CORREIA

Wind River Systems Inc. this month released Foundation HA, a set of extensions to VxWorks AE that it claims provides a framework for building devices for mission-critical applications that approach 99.999 percent reliability, the equivalent of about 5 minutes of downtime per year.

According to Ted Hartnell, product marketing manager for Wind River's Platforms business unit, Foundation HA adds to VxWorks AE—the high-end version of its real-time operating system—an alarm management framework that passes fault notifications to a new device management system, which in turn permits failing devices to be added, removed or reconfigured while a system is running. "These provide a structured framework for handling and isolating alarms" and matching them with the appropriate actions to address faults.



Extensions to VxWorks AE add an alarm management framework and hot-swap technology to remedy faults while the system is running.

The system also includes modules for adding hot-swap CompactPCI and CPU failover capabilities to a system, depending on the hardware configuration and the application's requirements, Hartnell said. Such systems, Hartnell added, are typically those in which developers expect partial system failure from continuous use or those that require periodic maintenance. "If something had to run for several years, then you expect components to fail or need to be replaced." Telecom applications are its primary target, he added.

Pricing starts at around $15,000 and is negotiated individually for each project. The extensions support PowerPC and *x*86 processors, and have been integrated with CompactPCI-based HA hardware from Motorola, the company (www.windriver.com) said. Development tools are sold as an add-on for Wind River's Tornado IDE, which runs on Linux, Solaris and Windows development workstations.

Hartnell described the high-availability market segment as disjointed and lacking unity. "Until now, HA has been very fragmented, with all the big telecom companies—Nortel, Alcatel and so on—building their own chassis and doing their own thing," he said, adding that the market could benefit from standardization. "People seemed to rally a little bit around CompactPCI," which he said currently has a market share of roughly 20 percent. "That's not by any means a pervasive standard, but we thought it was a good start. So we rallied behind that to develop a software standard. Having a customer be able to buy commercial off-the-shelf hardware and software seemed like a good idea."

Foundation HA sets itself apart from competitors, Hartnell said, by being hardware-specific. "The other vendors are more at the middleware area; they don't get down to the details at the hardware. The way we differ is that we are concentrating down at the hardware level. We are very good at developing [board support packages] and drivers," which frees developers from having to do this work. ▮

JAVA PHONES

◂ continued from page 1

applications also can serve to unburden workers in certain vertical markets. "For the construction industry, they can save workers from having to carry multiple devices, such as specialized calculators," which can now be replaced by software.

Who's building cellphone applications in Java? One developer in the financial trading market is HillCast Technologies Inc. (www.hillcast.com), which has created MidCast, a system that provides real-time streams of news and stock quotes, including level II data, to J2ME-enabled phones and other devices. According to Charles Ikard, head of business development at HillCast, the system was first introduced as a browser-based trading system using Java applets. "It took us only about six months to convert the whole thing to Java MIDlets," he said. MIDlets are Sun's name for Java applications written to its Mobile Information Device Profile (MIDP) specification.

Nextel's Ho also pointed to the larger potential of developing network-aware applications that can interact with other phones, network servers and databases. "These open a universe of opportunities. You can have a very thin Java application on the handset and tap into a huge database on the back end." As an example, Ho described an international dictionary available today that can check spellings and translate words into other languages.

Middleware can simplify database access for Java phones, says Sun's Sasaki.

Sasaki said that middleware can be an effective means of simplifying wireless database access. "The good news is that companies like ThinAirApps have tools that allow companies to drag and drop a front end to the back-end database, so it's extremely simple to create and deploy" mobile database solutions, he said.

TURNING JAPANESE FOR JAVA

According to Sasaki, Japan is even further along in adopting Java technology on phones than U.S. carriers are. He said that Japan's top three telecom carriers already are offering Java-enabled handsets, along with an array of professional and consumer applications ranging from real-time stock trading and home banking to Disney-branded games and mobile gambling.

Indeed, the Japanese have displayed a voracious appetite for the technology, gobbling up more than 3 million units from NTT DoCoMo, Japan's largest wireless carrier, in just the first three months after it had launched its iAppli services, Sasaki said. By comparison, Nextel hopes to have 1 million phones deployed by Christmas, he said. NTT DoCoMo (www.nttdocomo.com) charges a flat monthly fee for some applications and a per-packet fee for others, and offers six Java phone models, all with full color.

"We also have deployments now with [VodaPhone subsidiary] J-Phone," Sasaki continued, "which started shipping their 3D color handset in June. You can do some wild things with games, and they are doing things with [personal] navigation." KDDI, Japan's No. 2 operator, also is on board. Also in Asia is LG Telecom, which Sasaki said has been offering Java-based telephone services—which now number close to 500—since September.

Once an application is developed, Sasaki said all that remains for deployment is to contract with a carrier to provide workers with phones and a wireless network. It will be up to the developers to police their own work. "Like today's Internet, over time it's going to be hard to control what [wireless] applications are doing," he said. Like Nextel, NTT DoCoMo offers two deployment models for application developers. "In the controlled model, applications get tested and certified," and noncertified applications are allowed to operate freely on their network but are accompanied with disclaimers, Sasaki said. "But DoCoMo believes that for [the Java phone market] to really grow, they have to get out of the way and let the free market work." ▮

HILLCAST HANDLES HEAVY HITTERS

HillCast Technologies Inc.'s MidCast system provides real-time streams of news and stock quotes, including level II data, to J2ME-enabled phones and other devices. Charles Ikard, head of business development at HillCast, said MidCast is composed of a data link between market data vendors and the HillCast engine, which parses and formats the data for the devices, then pumps it over the Internet to the Java client software running on the device. "The client-side application is hard coded to contact our back-end system, log in and access the information."

HillCast (www.hillcast.com) targets wireless carriers and financial market data vendors, Ikard said, but added that the solution has much broader appeal. "It can be any data, whether it's a stock quote or inventory—we can do it with the same infrastructure," he said. "All you need is Java and access to our class files," which are included with the licensing fee.

The MidCast Java client displays stock quotes in real time.

The HillCast server software runs on Linux, Solaris and Windows, and pricing starts at around $250,000. Per-user monthly costs are between $10 and $70, Ikard said, and depend on which services are deployed and how the data is redistributed. "We can give you a simple parsing of Yahoo Finance, or we can give you streaming real-time financial data straight from the Nasdaq, which would cost a little more," he said. The company plans to add stock trading capabilities in early 2002.

–Edward J. Correia

Aligo Mobile Server Integrates With Forte

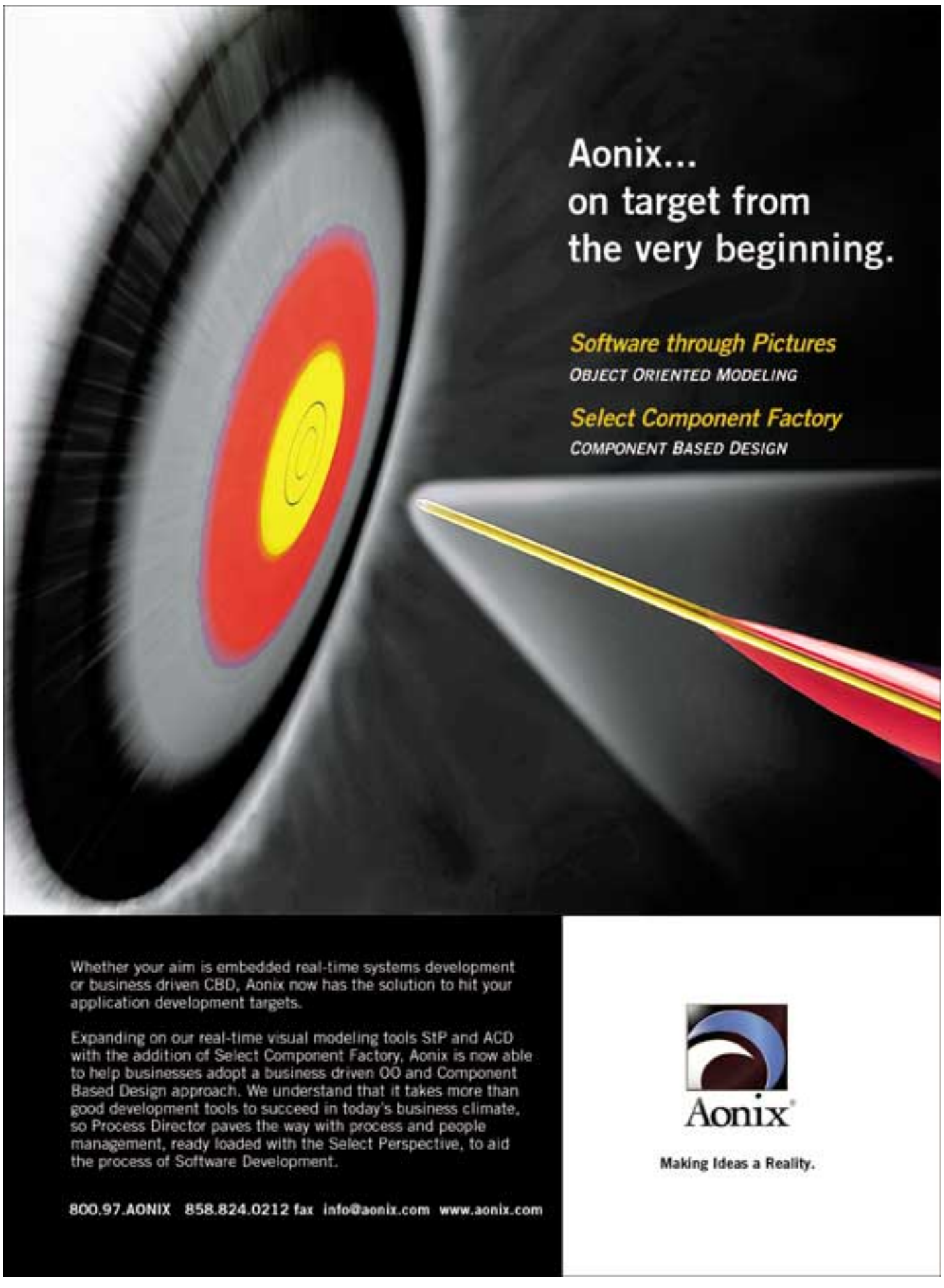
BY CHRISTINA M. PURPI

Developers using Sun Microsystems Inc.'s Forte for Java development environment will now be able to deploy Java applications to Aligo Inc.'s M-1 mobile application server from within the IDE, thanks to an integration agreement between the two companies.

Aligo sells its own IDE, M-1 Application Builder. But, claims Jeff Capone, Aligo's CTO, Sun wanted to integrate its Forte tools with Aligo's server because M-1 Server 2.0 is the only mobile app server that works with J2EE, and the integration eliminates steps from the development and deployment process.

M-1 Server 2.0 was released in June, and is priced at $50,000 per microprocessor.

From Aligo's (www.aligo.com) perspective, said Capone, the advantage of integrating with Forte is that "you can utilize M-1 with any J2EE environment. Any Java developer can use any J2EE environment to build an M-1 application," explained Capone. Further, he explained that because Forte uses open APIs, while other IDEs use closed standards, it was an easier choice. At this point, he said, there are no definite plans to integrate M-1 Server with any of the other major IDEs, but it is a strong possibility in the future. ▮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Annasoft Suite Jump-Starts Win CE-Based Devices

BY EDWARD J. CORREIA

Software developer Annasoft Systems has released a suite of solutions that it claims will give developers a leg up on their Windows CE designs based on ZF Micro's ZFx86 system-on-a-chip (SoC).

The suite includes Annasoft's Jump Start 3.0, a board support package with binary image builder settings and preconfigured drivers for Windows CE specifically tailored to the ZF SoC that the company claims can greatly reduce the time necessary to bring up a device. According to the company (www.annasoft.com), files include modifications to the Windows CE hardware abstraction layer, video and audio drivers for the TVIA CyberPro 5050, and drivers for IDE disk, ATA flash and CD-ROM and for a variety of I/O devices and ports.

Also new are ZF Boot Loader, a boot management utility that permits booting from flash without DOS; and ZF Persistent Storage, which can retain registry and other system settings in flash memory between power cycles, further easing development and device bring-up.

Jump Start 3.0 is priced at $995, ZF Boot Loader at $1,195, and ZF Persistent Storage at $495. The three also are sold as a bundle for $2,195. Individual runtimes cost $3 to $6 per device, or $2,500 for unlimited deployment. The tools work with ZF Micro's own integrated development environment, as well as with Microsoft's Platform Builder 3.0, according to the company. ▮

Boston Embedded Systems Conference Gains a Day

Show to host new classes from FPGAs to UML, wireless appliances to extreme modeling

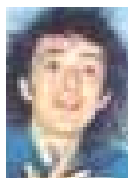
BY EDWARD J. CORREIA

This year's East Coast edition of CMP Media LLC's Embedded Systems Conference, which begins Sept. 4 and continues through Sept. 7 at Boston's Hynes Convention Center, will offer 84 classes spread over four days, one day more than last year's show. Among the courses will be those covering wireless architecture, Internet appliance and real-time system design, hardware/software co-design and device management techniques. About 160 vendors are scheduled to exhibit beginning on Wednesday.

Some of the 20 new courses offered this year will include designing wireless appliances, extreme modeling, rapid embedded system development with FPGAs, and managing the risks of adopting UML.

The event's keynote speakers are an interesting pairing of industry notables. The first keynote will feature Cliff Stoll, a long-haired Berkeley Unix developer with a Ph.D. in astronomy. He will present his contrarian observations of today's "ugly" computers and the aftershocks of living in a high-tech society. Stoll gained national notoriety when he stumbled onto an international spy ring after tracing hackers that had broken into the UC Berkeley computer systems.

The second keynote, titled "Open Source in Embedded: Dilemma or Delight?" will be presented by Red Hat Inc. CTO Michael Tiemann, an early pioneer of open source and co-founder and former CTO of Cygnus Solutions, an embedded software company now owned by Red Hat. Tiemann will explore whether open source will change the world of embedded systems or vice versa. ■



Stoll is the author of "The Cuckoo's Egg: Tracking a Spy Through a Maze of Computer Espionage."

Embedded Systems Conference Boston

CONFERENCE: Sept. 4-7
Hynes Convention Center, Boston

TUTORIALS:
Tuesday, 8:30 a.m.-4:30 p.m.

CLASSES:
Wednesday, 8:30 a.m.-5 p.m.
Thursday, 8:30 a.m.-5 p.m.
Friday, 8:30 a.m.-5 p.m.

EXHIBITOR WORKSHOPS:
Wednesday, 9 a.m.-5:30 p.m.
Thursday, 9 a.m.-5:30 p.m.
Friday, 9 a.m.-5:30 p.m.

EXHIBIT HOURS:
Wednesday, 2 p.m.-7 p.m.
Thursday, 1:30 p.m.-5 p.m.
Friday, 10 a.m.-2 p.m.

KEYNOTES:
Wednesday, 1 p.m.-2 p.m. "Reflections of a Computer Contrarian," Cliff Stoll
Thursday, 12:30 p.m.-1:30 p.m., "Open Source in Embedded: Dilemma or Delight?" Michael Tiemann
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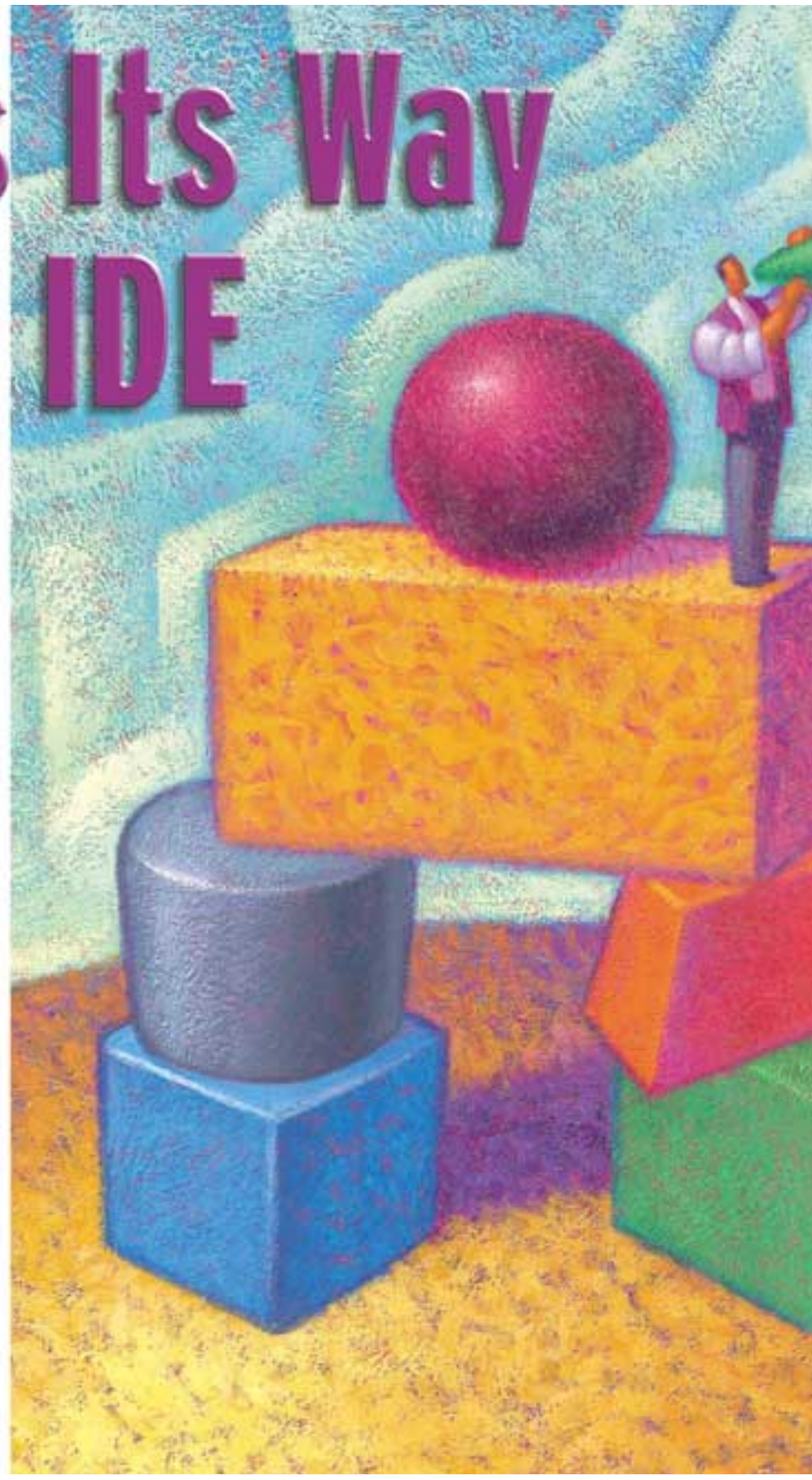
UML Makes Its Way Into the IDE



As modeling language matures, developers find its use for complex Web projects more essential than ever

BY JENNIFER DEJONG

With the next iteration of the Unified Modeling Language now under development, modeling tools are merging with development environments, enabling programmers to take advantage of the big-picture blueprint without having to interrupt the business of writing code.

The trend toward integration could well move UML—the 5-year-old industry standard for specifying, visualizing, constructing and documenting the artifacts of software systems—out of the realm of computer science and into the hands of corporate programmers, resulting in business applications that are easier to upgrade and maintain.

Essentially a collection of best practices that have proven successful in the modeling of complex systems, UML has value that is widely accepted and understood. But putting the specification to use has not always been within the practical reach of down-in-the-trenches developers.

Integrating UML tools with IDEs eases workflow, says Embarcadero's Schottland.

That's because modeling tools based on UML are only just beginning to be integrated with development environments. The trouble with traditional UML tools is that they force the programmer back and forth from design environment to development environment, said Greg Schottland, general manager of application development tools for Embarcadero Technologies Inc. (www.embarcadero.com). "That interrupts the workflow and forces the developer into a paradigm he doesn't want to work in," he said.

Embarcadero makes a design and development tool called Describe, which embeds UML functionality within an integrated development environment. The company currently supports Sun's Forte for Java, with plans to deliver versions for Borland's JBuilder, IBM's VisualAge for Java and WebGain's VisualCafé later this year.

In part because of the impracticality of switching back and forth between the design and development environments, UML tools have never been widely used, with current usage at only about 5 percent of all corporate development, said Jim Duggan, a vice president at research firm Gartner Inc. (www.gartner.com). "Modeling has gone in and out of fashion," he said. "The industry hit a particularly bad patch as it moved to the Web—there was a whole lot of development with less and less design."

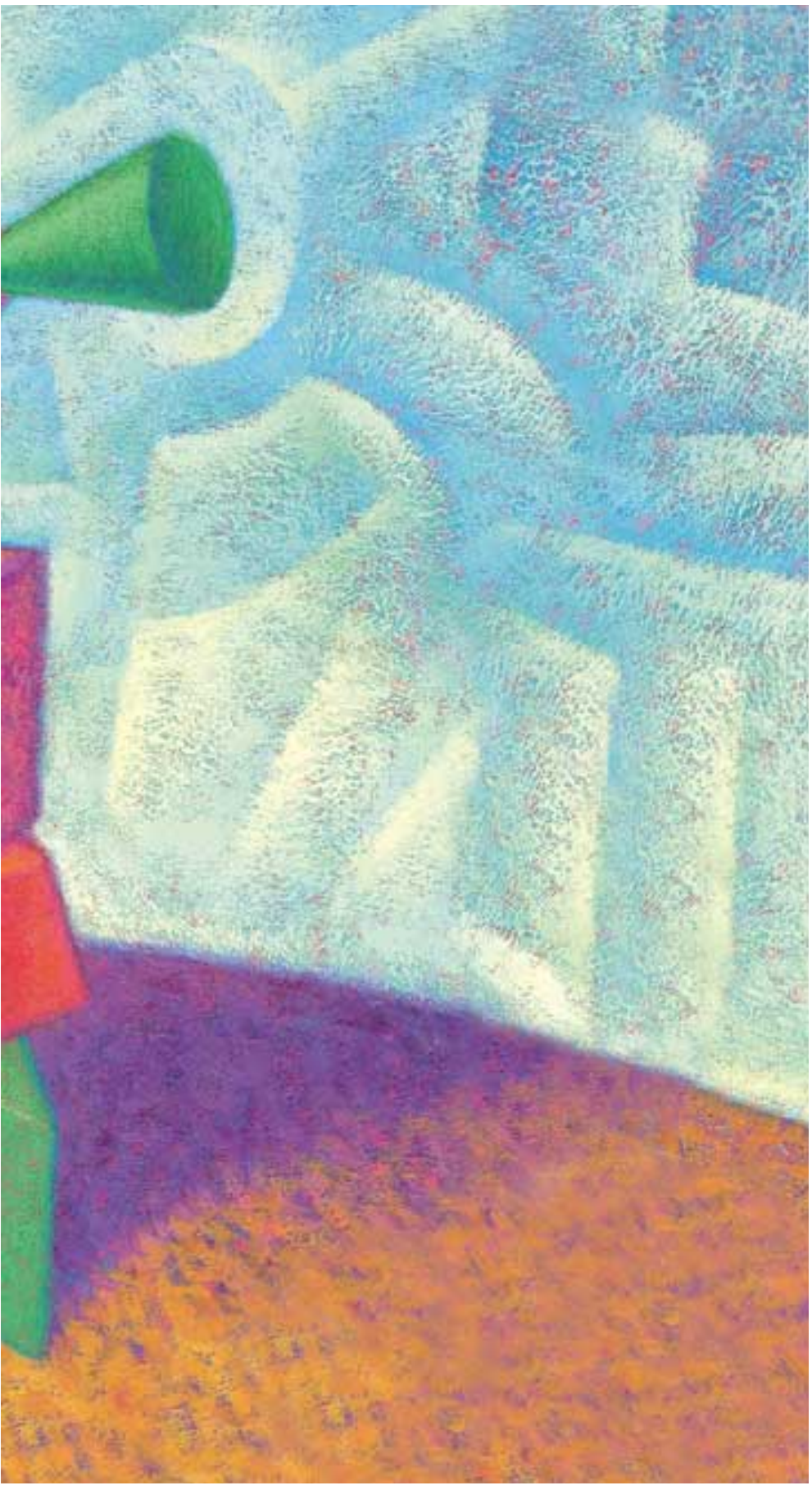
But Web development—and the penetration of Java in particular—has made UML tools more essential than ever before, according to Claire Dessaux, Oracle9i product marketing manager at Oracle Corp. "We are beginning to see the increase in UML demand," said Dessaux. That's not only because Web applications are by definition complex, she explained, but also because UML is easy for Java programmers to understand. "UML complements Java, in terms of integration," she said.

To that end, the company is implementing UML support in the upcoming version of its Java IDE, Oracle9i Jdeveloper 2.3. Currently in beta, it will be available before the end of the year, according to the company. Its key new feature is integration between the model and the code, said Dessaux, noting that changes in the model are automatically reflected in the code.

Other major vendors, including IBM Corp., are also in the process of integrating UML support into their Java development environments. "The goal is to take the UML design and generate the source code in WebSphere," said Stephen Brodsky, a software architect at IBM. He noted that to make that happen, WebSphere will integrate with the industry's most widely used UML tool, Rational Software Corp.'s Rose.

LOOKING AHEAD TO UML 2.0

UML support in Oracle's Jdeveloper (and other development environments that support the standard) is based on the current UML specification, 1.4. The development of UML 2.0 is currently under way, and is largely expected to be an incremental upgrade, in terms of new



A Fear That Modeling Tools Will Remove Programming From Development Process

Steve Ropa has seven programmers on his team. The youngest one just graduated from college; the oldest has more than 20 years of experience. Despite the age gap, the team members have something important in common: They all love to write code.

"The very nature of programming is that programmers think programming is fun," said the manager of the special development group at Lucent Technologies Inc.

It's a good thing Ropa and his team like their jobs. Day in and day out, they face the daunting challenge of developing the billing and customer-care applications for telephone companies such as Verizon. In the telecommunications field, where players are constantly converging, every time two companies merge—or customers demand a single bill for multiple services they subscribe to—the billing and customer-service applications have to merge, too, said Ropa.

Although the team is slowly making its way into Java, the programmers still do most of their work in C++. And because the applications they write are large and complex, they have long relied on modeling tools to add structure to the programs and to speed the overall development process.

But with UML 2.0 under way—and with an increasing number of modeling tools automating the code-generation process—Ropa worries that application development is headed in a direction that could take the heart and soul out of programming. "As more and more power goes into the computer, less and less is left to the programmer," he said. "I don't want to see [the companies behind UML 2.0] head too far in that direction," he added.

Topping his wish list for the next version of the modeling language is a better way to integrate UML diagrams with data. He hopes UML 2.0 will do a better job of specifying how to save objects into the relational databases relied on by the lion's share of corporate development shops.

A former user of Rational's Rose, Ropa abandoned the most popular UML tool in favor of Embarcadero's Describe. He likes the way the modeling language is integrated with the development language. "You throw a class on the screen and in the pane below, the code is generated," he said. "It's almost revolutionary."

The team uses the Describe version for C++ and is also experimenting with the version for Sun's Forte for Java.

While Ropa likes the fact the program generates code, his fear is that modeling tools might advance to the point where programmers couldn't work with the code at all. That poses a problem not just because his team would no longer enjoy a creative challenge, but also because the ability to tweak code is critical for improving performance. "Some of our applications have as many as 10 million records in the database," said Ropa.

What's more, programmers tend to think in terms of code. "There are lots of things you look at in the model, but they don't really make sense—you can't really get it," said Ropa. "I wish I had a nickel for every time I've said, 'Let me see it in the code.' "

He admitted that part of the issue is the way programmers like to think of themselves. "It's a self-appointed image—the hacker gone good," he said. "We can write some brilliant code; we're really going to make this thing sing."

When Ropa wants to motivate his team, he says, "Hey, you wrote some really great code." He hopes that the day never comes when he has to say, "Those are some really neat objects you put together." –*Jennifer deJong*

features and functions. The vendors involved—Hewlett-Packard Co., IBM, Oracle and Rational, among many others—say they are in agreement as to what it is likely to cover. Chief among the features they mention is the need for UML 2.0 to do a better job of specifying how components are created. UML 2.0 also is likely to address the issues such as traceability, which refers to the need to align the code generated by the model with the model itself.

But exactly which features will be implemented and how won't be clear until the process is complete later next year, said Jim Rumbaugh, a fellow at Rational and a key architect of the original UML specification.

Although Rational invented UML in the mid-1990s and its Rose modeling tool dominates the market, Rumbaugh emphasized that the development of UML 2.0 is a committee-based effort run by Object Management Group Inc., a not-for-profit consortium that produces and maintains computer industry specifications for interoperable enterprise applications. He said he does not expect products implementing 2.0 to appear until early in 2003.

As reported in the Aug. 1 issue of SD Times ("OMG Plans Major Changes for UML 2.0," page 1), OMG is in the midst of the formal request process, in which it invites its members to respond to four RFPs that collectively cover the territory UML 2.0 will address: UML 2.0 Infrastructure, UML 2.0 Superstructure, UML 2.0 OCL (Object Constraint Language) and UML 2.0 Diagram Interchange. Once the RFPs are accepted and reviewed—the last one is not due until early next year—OMG's members will cast their votes, determining what will end up in the final spec.

UML will not become a development environment, says HP's Mukerji.

Jon Siegel, director of technology transfer at OMG, said that to date, some 35 companies have sent letters of intent, indicating their plan to respond to one or more of the RFPs. Siegel said that UML is part of OMG's Model Driven Architecture (MDA), designed to support current and evolving standards.

▸ continued on page 28

UML TOOLS

◂ continued from page 27

He noted that although the UML 2.0 RFPs were written and issued before OMG's members agreed to adopt MDA, the companies responding are targeting their solutions to fit MDA.

MORE THAN A MODELING TOOL?

Despite the straightforward process, there has been some misunderstanding surrounding UML 2.0. Some industry watchers have speculated that the new version would depart so radically from earlier iterations that UML was in fact evolving into a development environment. But Rational's Rumbaugh emphasized that it would remain a modeling tool. "It is not the job of a standards body to make runtime environments," he said.

"The UML will continue to be a modeling language, a notation for doing such work," added Jishnu Mukerji, a senior technical representative at Hewlett-Packard and the company's OMG guru. Like IBM, HP will integrate Rational's Rose into its Java development environment.

In reality, the confusion has nothing to do with the UML 2.0 specification. The misunderstanding is fueled by the fact that the newly emerging UML tools not only integrate with the development environments, they also generate an increasingly large amount of code. That's led some to speculate the tools would automate the code generation to the ultimate degree, eliminating the need for programmers to program.

"That's the Holy Grail [of development tools]," said Gartner's Duggan. "That we could go from modeling to executables—but I'll be surprised if that happens in my lifetime. The problem will never be solved," he added.

"Lots of code will still be written by human beings," echoed HP's Mukerji. "The goal is to automate the boring parts, leaving the programmer to focus on the more creative aspects," he said. "You cannot automate creativity."

Duggan said that modeling tools will continue to evolve in that direction—generating the more mundane aspects of programs, leaving the developers to do the more creative work. But he noted that tools still have a long way to go, pointing out that Rational's Rose currently generates only class hierarchies and headers, not actual code.

As design tools become increasingly integrated into development environments, the result will be better-structured applications, as well as cost savings associated with modeling. Still, Duggan estimated that sophisticated design done with UML is unlikely to be more pervasive than 15 percent to 20 percent, even at its peak.

That's because UML, even in the forthcoming 2.0, is unlikely to successfully address the issues of creating the business logic of applications. "The UML guys say UML can represent everything," he said. "And, technically, that is correct. But it's not practical. UML is still aimed at the IT audience—and business users would need training to understand the diagrams," he said.

Embarcadero's Schottland agreed that UML must continue to evolve toward the business side, away from its academic roots. "The UML should never be an end-all in itself," he said. But UML tools will nonetheless remain important. "All developers design—even if the blueprint is in their head, there is some sort of mental process that goes on," he said. ■

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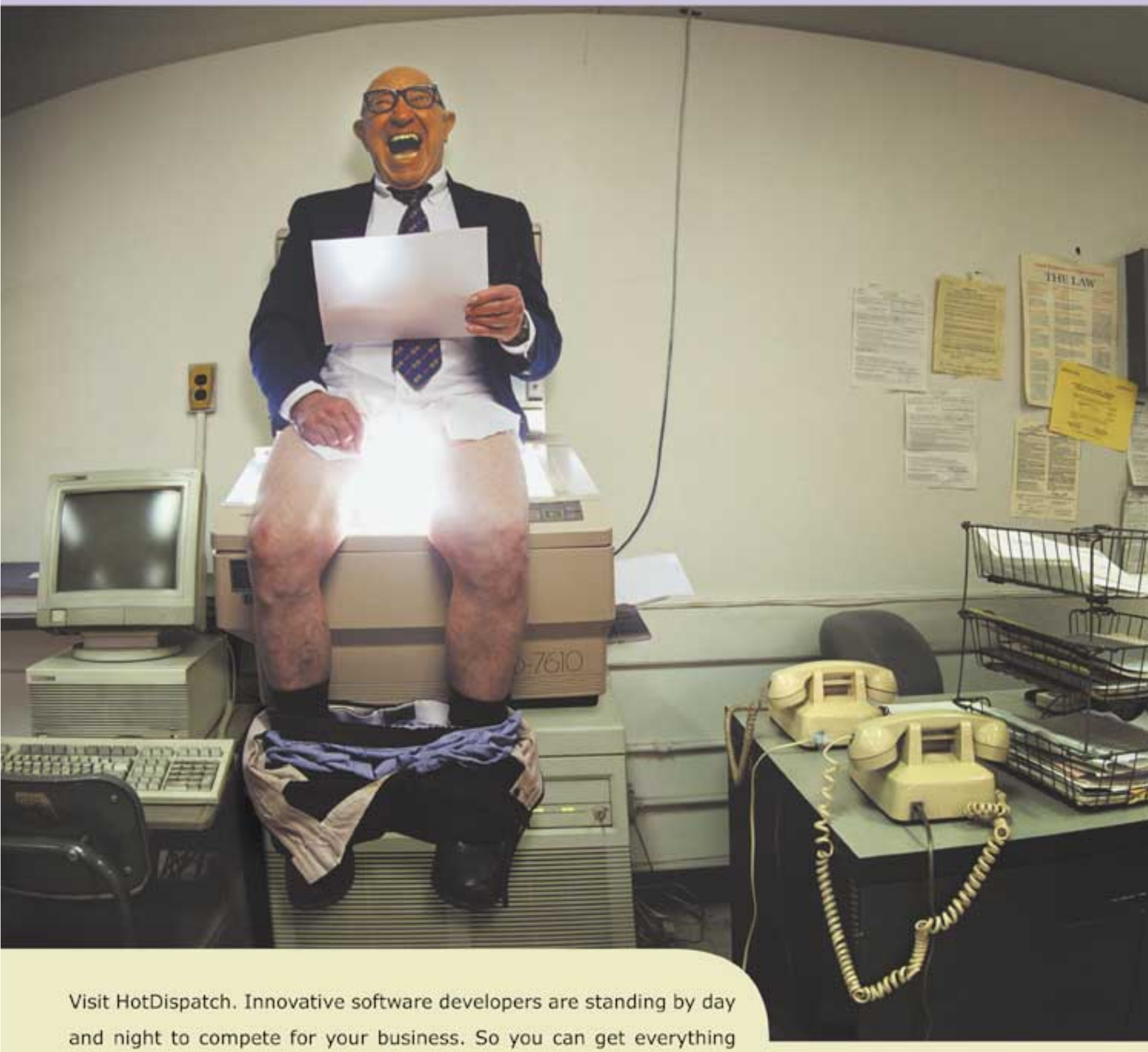

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EDITORIAL

Windows XP and The Microsoft JVM

When Microsoft Corp. suddenly announced that it would not include a Java Virtual Machine in its forthcoming Windows XP operating system, the initial reaction from the computing industry was shock and outrage. Editorials were written castigating Microsoft for pulling the plug on Java; there even was talk of a lawsuit to force Microsoft to change its plans.

And then it all blew over because, frankly, it's not a big deal.

There are three places where JVMs might be installed on Windows machines. On servers, the lack of a Microsoft JVM is not much of an inconvenience, as systems administrators can easily install free virtual machines from Sun or any number of third parties—and in fact would probably choose to do so anyway, since Microsoft's JVM was frozen at the JDK 1.1.4 level by virtue of the company's lawsuit with Sun. It's similarly easy for administrators to add an up-to-date JVM to new corporate Windows XP desktops.

The only place where there will be confusion is on consumer desktops; home and small-business users may not understand the need for a JVM, or know how to install one. We would encourage hardware manufacturers to preinstall JVMs on Windows XP-based desktop and notebook PCs, in order to better support those customers.

Who has Microsoft harmed? Certainly not Sun, which is focused on the enterprise market and expanding J2EE as a server technology. Microsoft has inconvenienced its business customers who want to run Java applications on the desktop, and has made life slightly difficult for consumers who choose to upgrade to Windows XP.654.

In fact, the Java community will actually benefit from Microsoft's decision, because developers can move more swiftly to the more feature-rich JDK 1.3 or forthcoming JDK 1.4. Previously, many developers had limited themselves by ensuring that their desktop apps would work with JDK 1.1.4, and thus maintain compatibility with Microsoft's obsolescent JVM. Moving forward, they will be under no such restrictions.

Microsoft also didn't help itself in the court of public opinion. For a company that talks so much about offering customers choice to suddenly dump a competitor's technology, this move doesn't look good. The announcement may not affect Microsoft's dispute with the Department of Justice, but it won't help its case either.

In fairness, one has to respect Microsoft's decision. The company has invested considerable resources in its C# language and Common Language Runtime. By completely abandoning any vestiges of Java, Microsoft is unequivocally demonstrating its commitment to its own language, middleware and runtime architecture. This move will encourage Windows-only developers to move away from Java and toward C#, therefore more tightly binding them to Windows and .NET. That may be all the justification that Microsoft requires.

The only question is timing. Why did Microsoft include its JVM in the first beta release of Windows XP, and remove it during the second beta? And why did Microsoft make its move in such a stealthy fashion, without public comment until beta customers noticed that the virtual machine was missing? For that, we have no answers. ▮

GUEST VIEW

EMBEDDED COMPUTING IN THE SoC ERA

WAYNE WOLF

Systems-on-chips (SoCs) are coming, and they will change the face of embedded system design. At one time, complex electronic systems were built one transistor at a time. Integrated circuit (IC) technology allowed us to put collections of transistors on chips and then build more complex systems by putting together ICs on printed-circuit boards. Today, IC technology has advanced to the point where we can put a very large complete system on a chip.

Several companies already build single-chip computer systems that include a complex 32-bit CPU, peripherals and memory. Some SoCs even contain multiple high-performance microprocessors. Sematech, an industry organization, predicts that by 2012 we will be able to buy chips with a billion transistors—more than enough to build a supercomputer and all its memory.

What does this mean for embedded computing and its practitioners? The good news is that embedded system designers will be in even greater demand than they are today. The only way to build these extremely complex chips at all, let alone the tight product cycles to which most ICs must be built, is to make liberal use of CPUs and memories as components.

To build chips with hundreds of millions of transistors, IC designers must take advantage of embedded system techniques. IC designers must learn how to think of CPUs, memories and I/O devices as components. They must also learn how to design software that satisfies many of the design goals traditionally reserved for hardware, such as meeting deadlines and conserving power. The infusion of embedded system design techniques into the IC design process creates new opportunities for embedded system designers.

And now the bad news: Embedded system designers who jump into the SoC arena must be ready for new challenges. The first is complexity itself. Although complex embedded systems have been around for quite some time—one of the first uses of the 68000 was in engine control—many embedded system designers are still used to building interesting systems out of relatively simple microprocessors. Using an 8-bit microprocessor to control a physical device like a motor makes a lot of sense. However, systems-on-chips will concentrate on higher-end applications for quite some time to justify the multibillion dollar investment in the fabrication line used to build them.

Because the SoC market needs complex systems, even more design starts will be for complex multiprocessors. These multiprocessors are usually heterogeneous, making design even more challenging. Scientific multiprocessors use a regular architecture to simplify programming. Embedded systems often put different types of processors at different points in the design to best match the computational needs of that part of the system. Embedded system designers must become more adept at creating these multiprocessor designs.

Another consequence of complexity is that these designs will be very software-intensive. Wireless systems, for example, use dynamic programming, adaptive signal processing and other complex algorithms to provide higher-quality service. This software of course must function properly, but it must also meet nonfunctional requirements that are not traditionally assigned to software. Embedded code must usually finish by its deadline. Determining the absolute worst-case performance of a piece of code is not always easy, as it may be difficult to determine which combination of input values exercises the longest path. Caches make the analysis of embedded software performance even more difficult.

Embedded software must also satisfy power requirements. Low-energy operation is of course critical for battery-powered systems. But power consumption has become a concern in every large integrated circuit. Not only is it difficult to get large amounts of current into a chip reliably, much of the power is dissipated as heat. Even chips destined for life on a board in an air-conditioned room are now designed with power consumption in mind to ensure that these chips are reliable and long-lived. Embedded software design in effect becomes a little more like hardware design in that it must meet power and performance goals as well as implement an intended function.

We can meet those nonfunctional requirements only by analyzing the software's operating characteristics on the hardware platform on which it will run. An embedded software designer for systems-on-chips must be adept at figuring out how those complex heterogeneous multiprocessors will affect their software.

This brings us to perhaps the most daunting problem—the difficulty of verifying systems-on-chips. Integrated circuit designers do as much of their debugging as possible before they even fabricate their chip once. Not only does a single fabrication run cost hundreds of thousands of dollars, but it also takes weeks or months. As a result, SoC designers rely on simulation much more than do traditional embedded system designers. SoC designers also have a much harder time plugging their chip into a system and running it at speed.

For the embedded system designer, design will become more of a science and engineering discipline. In the early days of microprocessors, embedded system design had to be an art given the severe limitations of the components. Today's components are much more powerful, even for board-level systems. Embedded SoC designers will make more extensive use of design tools. They will also use simulation and verification tools.

Also, more people will be trained explicitly to be embedded designers. Many people pick up the essentials of microprocessors at school but learn much of what they know about embedded system design from the School of Hard Knocks. Given the cost of designing these systems, universities must spend more time teaching fundamentals.

The next decade will be a great time to be an embedded system designer. Lots of exciting new systems will appear on the table and will require innovative, creative designers to turn them into reality. ▮

Wayne Wolf is professor of electrical engineering at Princeton University and chief scientist and principal SoC designer at MediaWorks Technology.

GUEST VIEW

XML WEB SERVICES: MORE THAN PROTOCOLS AND ACRONYMS

Everybody in IT kind of has this idea that at some point they're going to storm into the CEO's office and say, "Hey, look man, we've got it! We're in great shape. We're completely connected with our customers. We've got a complete Web presence. All our products are available online. Customers can search our site. They can find out anything about our products. We can completely get in touch with our customers through our CRM system. We've got complete knowledge of what they're doing, their demands, and we've got good marketing information on them. Our partners have a completely integrated supply chain. We have very low inventory levels. All of our internal systems are working together seamlessly. Our employees are very happy, absolutely connected, all benefits online, life couldn't be better. We feel great."

Of course, that doesn't really happen without tremendous effort. It's a very complex world, as we know, and it's difficult to get all this stuff to work together. But XML Web services can help take away a significant part of the pain of integration.

XML Web services are about letting systems work together and making code more available. Every developer has a simple goal: They want to write code that is used by lots and lots of people.

There are some fundamental characteristics of XML Web services that help developers achieve this goal. XML Web services are discoverable, self-describing, programmable and accessible via Internet protocols.

Discoverable: You've got to be able to find it. You can't just have a service available that nobody can find. You have got to be able to go out and discover that the right code exists and then be able to use it.

Self-describing: Once I find it, I have to know how to program to it. It needs to be able to tell me what kind of schema it has and what kind of parameters I need to pass it.

PAUL FLESSNER

Programmable: It's got to do something. When I pass it that schema and when I pass it those parameters, I need it to do some work and give me something back.

Accessible via Internet protocols: It doesn't help if all these pieces don't plug together. It's all got to be simple. It's got to be broad-based and work across Internet standards. It's got to be very much available in a ubiquitous way or else it doesn't plug together and it doesn't work.

These are all key components of what it means to be an XML Web service.

The most important aspect of XML Web services is that they don't discriminate. They don't care what kind of operating system sends a message. They don't care what kind of language was used to build that message. They don't care what kind of programming model it was. This is a huge advantage. The world that exists among you, your customers and your partners is heterogeneous, and working across that world is key. Being able to connect among all of your systems and have XML Web services just take a message and the parameters, process it and give it back without really needing to worry about what did it, frees you up from a whole variety of concerns. You can then build your Web services and deploy them on the platform that meets your business needs and not have to worry about the programming environment of any other organization.

The industry right now is talking a lot about XML to carry the content of XML Web services, SOAP and WSDL to allow systems to understand and invoke XML Web services, and UDDI to act as a directory for discovering XML Web services. It will take more than a bunch of protocols to impress your CEO. It's important to think about the entire picture and include all of the components it takes to really host an XML Web service or an application. At the lowest level you've got systems infrastructure, then there's the operating system and the application server.

You have to get the world set up so that you have the proper infrastructure, management, networking, storage and security including a firewall and a demilitarized zone.

Then you've got the application layer that will be made up of applications required by your business—things like database, commerce for your retail site, collaboration and messaging. You might argue that some of these elements should be lower or higher in the software stack. Perhaps, but that's not really the point. The point is it's a lot of infrastructure to make sure you've got a great XML Web services-based system.

While the industry talks about the importance of the basic protocols, it's time to look beyond that early view. It's an entire XML Web services-enabled software stack, not a group of three- and four-letter acronyms that will make affordable, reliable and genuinely deployable XML Web services a reality.

In helping to achieve this dream where you tell the CEO that the business is now completely ready to expand today and in the future, don't think about it in terms of just wrapping the entire application. Think about how going forward you can also write individual components of your application that may need to be extended and then aggregate those components into another application, which may then aggregate out into other applications.

It would be fun to be at the table and go, "Yeah, we're ready. IT is ready. If you want to extend that application out, our architecture is flexible. It's ready. We're ready to move. We can be hooked up. Let's go." ▮

Paul Flessner is senior vice president of Microsoft Corp.'s .NET Enterprise Server Division.

LETTERS TO THE EDITOR

APPLE'S SECRET

WebObjects ["Apple Joins Mainstream With WebObjects 5 Server," July 1, page 1] has been described as Apple's "best-kept secret." The fact is that WebObjects is an excellent Web development tool, due in large part to its architecture, as this article points out.

The article focuses more on WO Builder and the presentation layer, which is one thing that makes WebObjects stand out from other similar development tools. But the "crown jewel" (at least on par with the presentation layer) of WebObjects in my opinion is actually EOF (Enterprise Objects Framework)—the persistence layer (relational to object mapping).

Competing tools to EOF are in my experience few and far between—they also are much more expensive, or not cross-platform or make inappropriate use of code generation. While the persistence layer of WebObjects is mentioned in the article, it is not named or focused on.

It seems to me that in the application server market, a developer has to cobble together the various layers themselves, whereas WebObjects comes as an integrated package. In my opinion, this should be stressed in an article about the strengths of WebObjects, and its various layers should be named and explained. In fact, recent posts on WebObjects mailing lists have been about how to use EOF with other Java application servers or even Java client applications.

Steven K. Besler
Vice President of Research and Development
Global Village Consulting Inc.

SEEK AND YE SHALL FIND

["SoftWire 3.0 Gets Visual Debugger," July 15, page 21] was very nice—with two exceptions.

SoftWire's Web address is www.softwire.com, not www.softwiretechnology.com—as stated in the article.

You might want to make sure that the company actually has "released" the product, or at least makes "some" reference to it on their site before getting us all excited. I navigated on over and there is virtually no reference to a new version anywhere; everything refers to v2.0.

Other than those two items, the article was "just fine."

Jack Verna
Program Manager
United Information Systems Inc.

Editor's note: Either URL will get you to SoftWire's Web site. Information about SoftWire 3.0 now appears on the site. SD Times often reports on events before they are made public.

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A FEW GOOD TOOLS

Readers who have worked through my past few columns have become a little testy in their correspondence. Along with the charges that I have sold out, caved in, am no good, they have made clear they don't like my talking about shortcomings in Java. Rather than defend myself against charges of treason, I softly offer the reminder that knowing your tools' weaknesses is critical to using them well. Dialogue about shortcomings is important, not only in programming but in more important areas of real life, such as the way you treat people, and the way you treat people with whom you disagree.

For example, few will disagree with the assertion that Java lacks the high-quality development tools found in the C/C++ arena. Most surveys of Java programmers highlight this point as a leading complaint, and it is borne out by the number of Java heads who use emacs to code and println-based variable dumps to debug (much like C developers did 15 years ago). Surely, there are better tools than this meager tool set. Jim Gosling opined in a recent interview on DevX.com, "There are very few good tools at the high end of the scale." But surely there are more than the survey implies. And indeed there are. In the past month alone, three very impressive Java development tools have begun shipping.

The first is JBuilder 5, the latest incarnation of the most popular Java IDE. I have discussed previous versions of JBuilder in this column; and my enthusiasm remains high after my inspection of this release. Borland has added numerous valuable features. The most important is extensive support for XML: Just about anything you would want to do with XML as a Java programmer is now supported. In addition to the expected functions (XML browsing, validation, generation through wizards and the like), there are numerous beans that encapsulate XML database access. Predictably, all the standard Java XML tools such as SAX, Xerces and Xalan also are integrated. Other new features include direct support for BEA's WebLogic 5.1 and 6.0, IBM's WebSphere 3.5 and Apache's Tomcat 3.2 and 4.0. Separately, Borland's JBuilder remains the leading environment for EJB and CORBA integration.

All this is in addition to a very fine development environment. JBuilder 5 is an excellent product that should be given careful consideration if you're still one of those using text-based tools and dumping variables to the screen. It will make a lot of things easier for you.

MIDDLEWARE WATCH

ANDREW BINSTOCK

The second is Sitraka's JProbe 3.0. JProbe is a suite of tools that provides code coverage analysis and performance measurement with granularity down to the line of code. Version 3.0 enables programmers to obtain progress reports from succeeding runs of performance analysis. This gives developers a visual comparison of how much things have improved and where they have degraded. The latter is critically important when systems are being substantially rearchitected or refactored. In addition, the product has analysis triggers, meaning data capture can be set to start only when a code trigger is tripped. By limiting data collection (rather than the more traditional approach of collecting everything but reporting selectively), large programs can run at full speed for most of their execution, slowing only in the triggered code. If you have never used JProbe, you owe yourself a free test download of this tool.

The last, and the most impressive, of the new tools is Joshua Bloch's book "Effective Java." This work presents a series of coding principles for Java. It thoughtfully explains practices to embrace and practices to avoid. The tips (nearly 60 in all) are not the usual claptrap of "Don't use cutting-edge features" or "Document only when necessary" and other useless bromides. Rather the advice pertains to the design of APIs, the misuse of exceptions, the handling of numerous constants, interfaces versus abstract classes and so forth—all practical problems with which seasoned developers grapple.

In my estimation, no more than one good programming book appears per year (and there are certainly many years that saw none): Knuth's trilogy, the K&R White Book, Kernighan and Plauger's "Software Tools," Tanenbaum's "Operating Systems" (which was the basis for Linux), Allen Holub's "Compiler Construction in C," The Dragon Book, Peter van der Linden's "Expert C Programming," and "The Pragmatic Programmer" by Hunt, Thomas and Cunningham are just about the whole crop. (A few others will undoubtedly be brought to my attention by thoughtful readers, whom I thank in advance.) Bloch's book fits in well with this august company. Get it! ▮

Andrew Binstock is the principal analyst at Pacific Data Works LLC. Reach him at abinstock@pacificdataworks.com.

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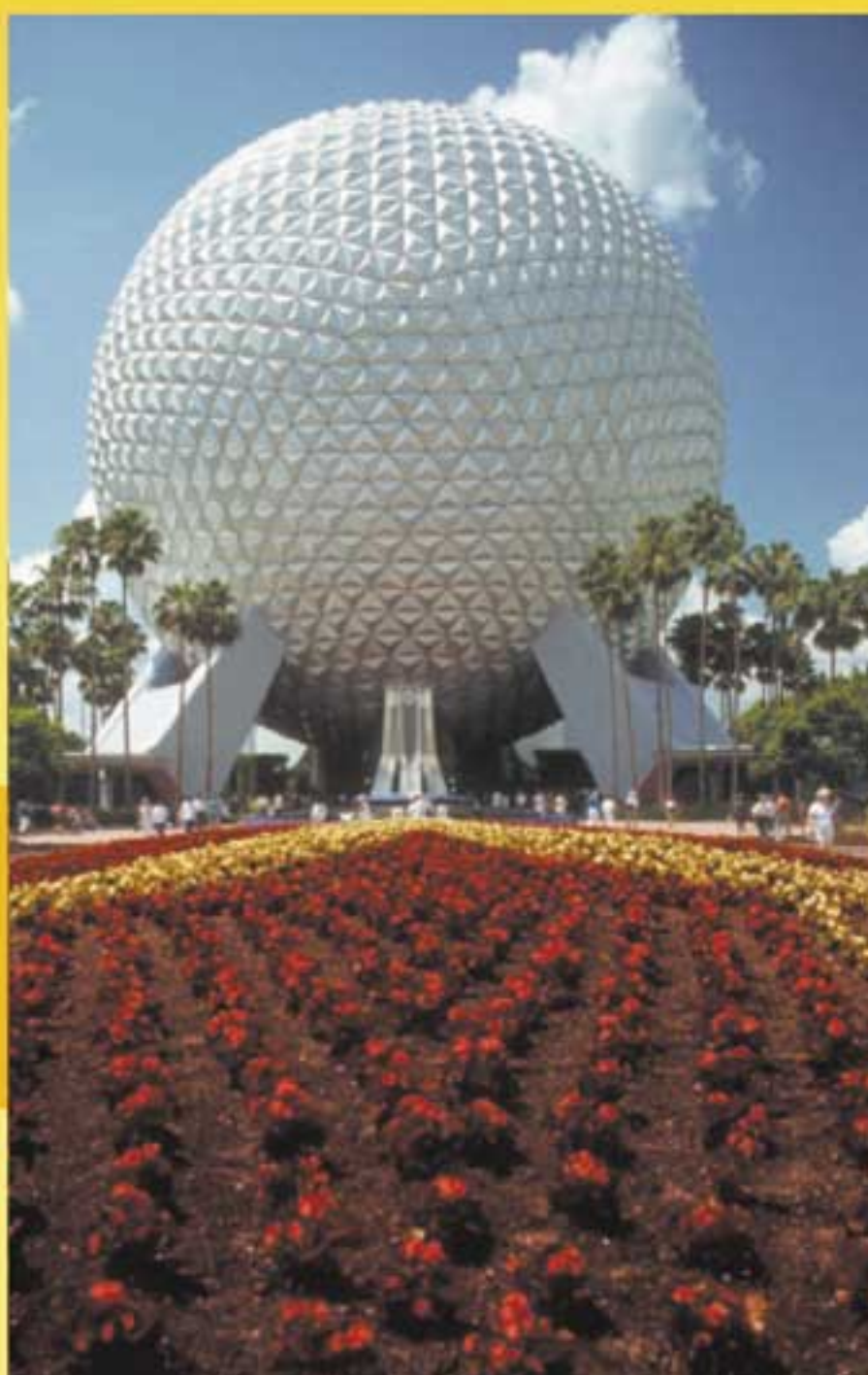

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DROPPING JAVA FROM THE MENU

Perusing the Wall Street Journal yesterday, my eyes latched onto a story proclaiming that Microsoft had "dropped support for Java"—not only from its development tool stable but from its new XP operating system as well, and didn't this smack of an anti-Java conspiracy in the land of rain and Starbucks?

The story proved more or less factually true when Microsoft representatives demonstrated the new features of Visual Studio.NET to me later the same day. Visual Studio.NET does indeed drop the Visual J++ product from its out-of-the-box stable, sticking instead to Visual C++.NET, Visual Basic.NET and C#, but that's nothing new for this version.

What gets me is the implication that this is a Microsoft attack on Java. Didn't the Justice Department want Microsoft to take its paws off competing vendors' technology? Sun was one of the most vehement proponents of this idea. Now Microsoft starts to do this, and everyone's upset. Damned if you do; damned if you don't.

The stickiest point here, I suppose, is Microsoft's decision not to include a Java VM with Windows XP. However, Microsoft places no restrictions on third-party vendors installing Java client software over XP, especially at the OEM level. There will be plenty of Windows XP users running Java whether or not they need to install the requisite client software themselves.

The idea that Microsoft had nefarious goals in mind when it dropped support for Java in its development tool product line is simply ridiculous. The settlement with Sun crippled Microsoft's ability to release a competitive Java development tool. Frankly, the Visual J++ IDE always got pretty solid reviews from programmers in my presence; that really wasn't the problem. What Sun hated were the hidden Microsoft traps, but Redmond actually allows you to turn this off in the last release and even dropped the cost of the IDE down to a piddly $99—and still nobody bought it. Why? Because the company is forced to work one JDK generation behind everyone else, and that's not something a Web developer wants to hear.

So if you're Microsoft, do you keep offering a product that your competition effectively crippled? Or do you drop the dead weight? The latter, especially when you can still rely on third-party ISVs to build plenty of Java development environments that will run on your operating platform.

WINDOWS WATCH

OLIVER RIST

Heck, Microsoft even has released an SDK that allows third-party developers to integrate different languages into the Visual Studio.NET IDE at varying levels. You can integrate simply at a cross-language communication level or deeply enough that your product can actually make use of the Visual Studio.NET's integrated IDE features—something similar to a Hewlett-Packard OpenView framework plug-in. It's a fair bet that Java is going to creep in there sooner or later.

In fact, Visual Studio.NET impressed me overall. Getting away from the Java diatribe, the second beta of Visual Studio.NET is definitely worth evaluation, especially now that a bug in the first beta 2 release has forced Microsoft to release all subsequent beta 2 copies with the Enterprise version of Visual Studio.NET. Not only does this version include some very cool data modeling and consultantware tools, but it also includes (for the first time) a runtime license that allows beta 2 users to deploy applications written with Visual Studio.NET in a production environment, as long as users commit to buying the tool when it gets released.

The consultantware features include a central Web-based project site that not only acts as a communication hub for project members but also allows architects to impose technology and documentation specifications—customizable right up the point when Visual Studio.NET will inform your boss if your code strays outside those specs. That's cool for us managers but might be considered an intrusion by coders.

Universally attractive, however, will be Visual Studio.NET's new data modeling tools. Based on Visio, these tools include not only the ability to model databases in logical and physical dimensions (all adhering to UML) but also in a new way that Redmond has dubbed the conceptual method. This lets Visual Studio.NET turn English-style business rules into UML. Microsoft says this will now allow developers to pull business-knowledgeable experts directly into the database development cycle. Watching the demo, I agree, though you'll still be doing it from a database developer's workstation.

A final word about Java. Sun has long asked Microsoft to leave Java to its own devices, which is all that's really happened. Now that Java is finally Redmond-free, the big, bad Microsoft excuse should go away. Time to compete on straight technology. ▮

Oliver Rist is vice president of product development for rCASH in the REALM. Reach him at orist@mindspring.com.

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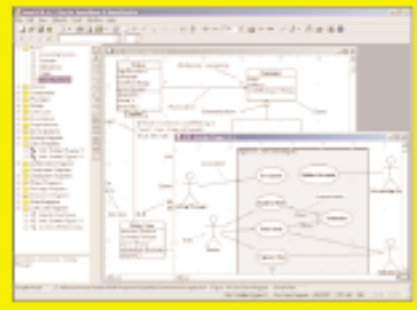

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GIVE GOOD WEB AND PEOPLE WILL RETURN

It was a commerce site that I hadn't visited before, so I watched with growing interest as a series of alerts appeared on my screen. My firewall was telling me of one request after another for things like server access on my network, queries about my installation, attempts to download software I hadn't requested, and the like. I checked the hardware firewall further upstream and looked at its alert log and found still more attempts to probe my system. I spent a few minutes querying the IP addresses, mostly out of curiosity at this point, since it didn't matter what the commerce site had to offer any longer—I wasn't buying.

I found it interesting that most of the queries didn't appear to originate at the site, but rather at some IP addresses located within major service providers. However, when I left the site, most of them stopped. Interestingly, a few of the services at that Web site clearly had a memory, because I continued to get occasional hits on my firewall until I changed my DHCP-generated IP address later that day.

It was an interesting experience, but not one that I'd like to repeat on a regular basis. It appeared, although there's no way to prove this, that the commerce site I was visiting was also home to a collection of services that were related to either gathering addresses for spam, or perhaps something more nefarious. What I was really concerned about was that some of the various attempts to download software weren't simply Java applets, but rather stealth programs for putting together denial-of-service attacks.

Of course, I won't be visiting that site ever again. But even if the site wasn't being used for anything suspicious, I had to wonder about all the probes. Why was it that the operators of the site felt that they needed this information? If they wanted my e-mail address, couldn't they do it politely and just ask for it? If they wanted to know what sites I'd visited lately, wouldn't it be helpful if they just asked permission before attempting to get the information they wanted or needed?

Because the operators of the site attempted to extract information from me without my permission, they lost my business forever. Sure, I'm just one potential customer, and they probably get paid some kind of fee for hosting the information-gathering service or for selling the information if they gather it themselves, but still it seems that the process doesn't make sense if they lose customers as a result.

Of course, you probably don't care very much about sites like this. You've certainly got a firewall between your network and the Internet. You've probably got a personal firewall such as ZoneAlert for use when you travel or work from home. So you're safe.

WEB WATCH

WAYNE RASH

But what about your commerce site? Have you taken a look at what you're asking of your customers? Sure, you're probably not collecting information on behalf of third parties without disclosing that to your customers, but what are you actually asking for? Do you even know?

I was once talking to the CIO of a major chemical products company about his company's Web site. He was exasperated because he'd just made one of the occasional visits he likes to make to his own Web site. He wasn't happy with what he saw. Changes he'd been assured were in the works hadn't been made, and a few functions and links were still broken long after they were supposed to be fixed. His site was implanting cookies on customer's computers for functions that were long discarded. "You know," he said, shaking his head, "now that I've visited the Web site, I'm not sure I'd buy anything from my own company."

Of course, it probably pays to do more than look. If you have an active Web site that plays a significant role in your business, maybe it's time to hire a quality-control staffer who has the full-time job of making sure your Web site is actually doing what it's supposed to do. This can mean activities such as placing orders, requesting literature, downloading product specs or just doing such simple things as looking for a mailing address or contact information for the investor relations office.

Clearly, this means you'll have to spend some time deciding what the guidelines for your Web site should be, but that's not a bad thing either. One of the challenges of managing a dynamic environment such as a corporate Web site is that it's hard to keep up with what's actually going on there. Making sure you know, and making sure you have specific guidelines about what's on the site and what the site is asking from its visitors can go a long way in keeping your visitors, and therefore your customers, happy. ▮

Wayne Rash is a technology journalist and consultant. Reach him at wrash @mindspring.com.

BEST LEADERSHIP PRACTICES

In "A Prairie Home Companion," Lake Wobegon is bigger and better than anything in real life. In that Norman Rockwell-esque small town, all the women are strong, all the men are good-looking, and all the children are above average.

So it is with many books that purport to provide best practices for managing software projects. They're idealistic, presenting a world in which the project-management software is strong, the requirements are good-looking, and the programmers are above average. That makes for fine fiction, or for executive symposiums at development conferences, but the real world isn't like that.

That's where Ed Sullivan's "Under Pressure and On Time" is a breath of fresh air. It's not pompous or idealistic. Sure, he's proud of what he's accomplished in seven years with NuMega Technologies Inc., pushing the development of BoundsChecker and other projects as director of engineering (NuMega was acquired by Compuware Corp. in 1999). You relive his experiences as a hands-on manager with responsibility for hiring, firing, planning, revising—whatever it takes to get a product out the door in time to hit the market opportunities.

The first half of the book, in which Sullivan discusses the people stuff, is my favorite. Even though the economic slowdown has made it easier to find and retain talented staff, it's still not a piece of cake. He has good advice on the process of screening resumes, interviewing programmers and keeping top-flight people from waltzing out the door. For example, when reviewing work experience, he suggests that you look for active words, such as "delivered" or "defined," as opposed to the more passive "worked on" or "assisted." Then, dive deep: If the candidate designed an application, why not ask her to sketch its architecture on a white board? You'll be able to learn not only about her technical expertise, but also about her confidence and presentation skills.

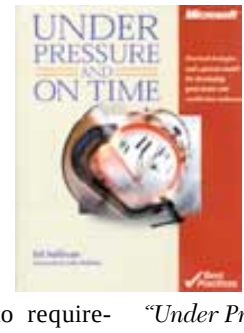
BOOK WATCH

ALAN ZEICHICK

Sullivan advised creating a culture that values everyone's contribution, but suggests that you overtly acknowledge that some employees contribute more than others by defining an inner, middle and outer circle within each team or department, with perks—and responsibilities—assigned accordingly. The use of the rankings, he argues, lets you provide employees with an incentive for improving, as well as the opportunity for recognizing their progress. It's an interesting concept, but it's hard to see how well that can work in practice, particularly when more common ranking programs, such as job titles, perform much the same function. It may also be difficult, in a larger company, to square formal "circle" designations across team boundaries in a way that's not subjective on the team manager's part or puts the company in HR-related lawsuit hell.

Sullivan likes things neat and tidy, and that carries over into his chapters on software tools, source-code management and bug tracking. He describes techniques that he's tried in the past, with both positive and negative results, and then discusses how project artifacts are handled at NuMega. It's the personal experience—the "It's how we do things and why" as opposed to "Here's how you ought to do things"—that gives Sullivan's book the ring of authenticity often lacking in management titles.

Another outstanding section covers release engineering. Sullivan describes the responsibilities that his release engineers carry, from defining, creating and managing the build environment, through conducting unit testing and basic QA. He argues that the creation of make files, the care and feeding of build machines and labs, and definition of automated installation tools should be under the control of the release engineers, not of the application developers.



The second half of "Under Pressure" is split between project definition and project execution. When it comes to requirements gathering, there's always a difficult dance between definite customer needs, self-generated innovation, and the resources needed to execute them all, while still hitting externally generated release dates. Even development managers working on internally focused projects, rather than software for commercial sale, will find Sullivan's comments insightful. For example, he advises that application performance tests be run after every iteration of the code, instead of being saved for the end. That way, if a change adversely impacts performance, this can be detected instantly.

The final section shows how to define a project plan and stick to it. To that end, Sullivan reveals his techniques for measuring and monitoring progress. Sullivan acknowledges that no battle plan survives contact with the enemy: Requirements will likely change during development—and the manager must accommodate those changes, sometimes by working miracles, sometimes by acquiring resources, sometimes by dumping features. He also has useful suggestions for dealing with beta tests, managing the GA release and finally closing out the project.

Even if all your coders really are strong, the QA team is good-looking, and the user-interface designers are above average, this book provides the genuine hometown experience. ▮

"Under Pressure and On Time," Ed Sullivan. Microsoft Press, 2001. Trade paper, 271 pages, $29.99

Alan Zeichick is editor-in-chief of SD Times.

ADVENTURES IN VENTURE CAPITAL

There are 800,000 fewer millionaires in America than there were at the end of 1999. Most of them made and then lost their fortunes riding the dot-com wave.

From its high in March 2000 to its low in April, the Nasdaq stock index, loaded with high-technology issues, lost $4.5 trillion, or two-thirds of its value. Bellwether issues reflect this precipitous decline: Yahoo has lost almost 92 percent of its value from March 2000 to April; Lucent's market capitalization declined almost 90 percent. Microsoft lost almost 44 percent in that time, while Oracle fell almost 67 percent.

MONEY WATCH

DAVID RUBINSTEIN

The burst of the dot-com industry, and the subsequent devaluation of the high-tech sector in general, has caused much pain and confusion. Aside from the individual stories of unemployment and personal hardship—and the loss of income, self-esteem and uncertainty about one's future cannot be understated—perhaps nowhere has this implosion had more staggering impact than in the venture capital markets.

To understand where all this wealth has gone, one must first take a look at where it came from. Much of it was provided by institutional investors—pension funds, college endowments, corporation funds and the like—in the form of venture capital. It is the venture capital funds that fueled the technology explosion of 1999 and early 2000, yet for the first time in history, the venture market saw a negative return for the 12-month period ending in March. You must understand; this is an industry that is used to seeing high double-digit returns on investments. One Silicon Valley venture capitalist called the current environment the most difficult of his 16-year career.

Back in 1999, when venture funds poured $58.8 billion in to start-up companies, managers were willing to roll the dice with any company that came forward with the words "dot-com" attached. As we have learned, many of these companies had no real business plan, and their models for generating revenue and income were weak at best. But as IPOs sailed higher and higher, return on those investments seemed guaranteed.

Last year, another $103 billion was pumped into start-ups, according to figures released by the National Venture Capital Association, an industry trade group. But as technology valuations plummeted, the VCs retrenched. For the first half of this year, only $22.8 billion had been invested. Much of this money, by the way, has been diverted from Internet and software companies as biotechnology came into favor. Medical sciences and health start-ups received $1.47 billion in this year's second quarter, a 37 percent increase from a year ago.

Does this mean that money for new technologies has dried up? To a degree. Fund managers and venture capitalists are simply being smarter. No longer will a slick businessman with a half-baked business plan get carte blanche simply because he claims to have a niche Internet community. Many of these businesses have been left on the banks as the flow of capital dried up and they could not sustain themselves. But just as VC investors realize the technology sector was way overvalued just two years ago, they also believe the sector today is undervalued, and that "excellent opportunities exist," said NVCA president Mark Heesen.

One thing venture capitalists seem to have going for them is that by nature, because of the types of funds they manage, they traditionally take a very long-term view of performance. Although the short-term players have devastated technology stocks, private equity investors are looking for companies with good management and solid plans for sustained growth. While they have felt the pressures of an unrelenting slide, the long-term play is where their money lies. The NVCA report shows that VC funds formed in 1996 have returned 3.8 times their invested capital, while funds formed in 1999 have yielded only a 12 percent return; these funds simply are too young and will suffer from having most of the money pumped into New Economy companies.

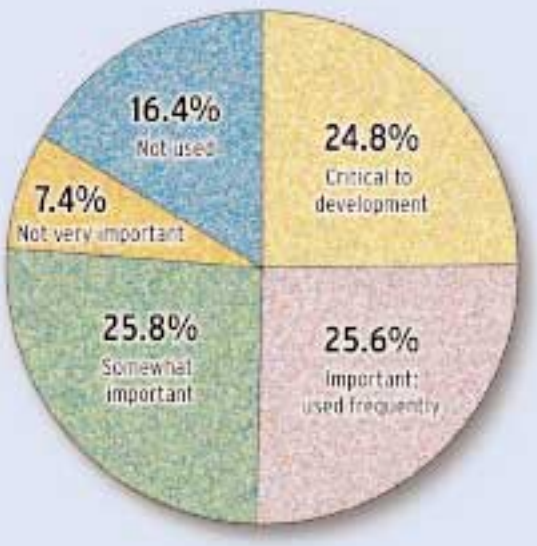
The money is there. NVCA expects another $40 billion to be pumped into venture funds by the end of this year. It is just that the venture capitalists are being a lot more selective before they take a plunge. New cutting-edge technologies that can be shown to be revolutionary always will get funded; it is this innovation that will continue to drive the high-tech sector forward.

But we can say so long to the opportunists looking to make a quick buck with an Internet scheme that is only slightly more legitimate than a game of three-card monte. ▮

David Rubinstein is executive editor of SD Times.

How Important Are Modeling Tools In Database Development?

EVANS DATA WATCH



More than three-quarters of database developers surveyed said modeling tools are at least somewhat important to them in their work, with 25 percent of those saying the tools are critical to development.

Only 7 percent said that modeling tools are not important to them, while another 16 percent said they do not use database modeling tools. The survey was responded to by 632 database developers in July.

SOURCE: Database Developer Survey, July 2001
www.evansdata.com

BUSINESS BRIEFS

NeuVis Software Inc. has recently acquired an additional $10 million in funding from companies such as **Goldman Sachs**, **Lehman Brothers** and **General Electric**. The extra revenue will support continued product development and an expanded sales and marketing campaign in the XML and Web services industry . . . According to Gartner Dataquest, **Compaq Computer Corp.** has dominated the Windows CE market in the second quarter based on the news that its iPAQ H3630 and H3660 can now be upgraded to future versions of Microsoft Corp.'s Pocket PC operating system. Compaq shipped approximately a half-million units, which will reduce the cost of implementing and maintaining a PDA strategy . . . **ANT Ltd.** has received a new round of VC-initiated funding that totals more than $3.6 million, bringing its total investment to $11.9 million. **VCF Partners** invested the majority of the funds, with $2.8 million from two venture capital trusts: **Foresight Technology** and **TriVest**.

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Enterprise Web & Corporate Portal Conference & Expo — Sept. 5–6
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JDJEdge Java Conference & Expo — Sept. 23–26
New York
SYS-CON MEDIA INC.
www.sys-con.com/javaedge

XML One & Webservices One — Sept. 30–Oct. 4
San Jose, Calif.
101 COMMUNICATIONS LLC
www.xmlconference.com/sanjose

Communications Design Conference — Oct. 1–4
San Jose, Calif.
CMP MEDIA LLC
www.commdesignconference.com

Embedded Linux Expo & Conference — Oct. 2–3
Boston
RTC GROUP
www.rtcgroup.com/elinuxexpo/boston

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